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THAT LACK OF ORGANIZATION leads to bankruptcy is a truth amply buttressed with facts. Even the smallest store can not successfully be managed without system. If only one person conducts it, nevertheless it requires organization in the sense of cooperation between the owner and the jobbers from whom he buys his supplies. What is true of the units of a trade is true of the trade as a whole. Progress toward better conditions is slow and uncertain unless all its factors are coordinated through association. A comparison of the circumstances in which sheet metal contractors operated twenty years ago with the present state of their business reveals marvelous improvements the majority of which are directly traceable to collective effort through the medium of organization.

Unite For Prosperity.

The National Association of Sheet Metal Contractors of the United States is a convincing illustration of the necessity and advantages of working together for the common good. The annual report of its president, George Harms, delivered at the fifteenth yearly convention of the organization, June 11, 1919, at Columbus, Ohio, puts a strong emphasis upon the value of legitimate combination for the furtherance of the general interests of a particular industry. This report, which is reproduced in full elsewhere in this issue of AMERICAN ARTISAN AND HARDWARE RECORD, preaches the gospel of cooperation. Translated into other terms, this means union of thought and purpose for the establishment and maintenance of high standards of material, workmanship, and service. By no other means can lasting prosperity be secured. Hence arises the wisdom of President Harms in giving this advice to the members of his association:

"Be very particular to use only good grades of tin and iron. Don't buy anything just because it is cheaper. Buy the best and pay the price. Employ the best mechanics you can get and insist that none but good work leave your shop. Let it be known that you are a member of one of the best trade associations and that its members stand for quality, first, last, and always."

THERE IS AN OLD Latin saying, *Tot capita quot sententiæ,* which, freely interpreted, signifies that there are as many different opinions in this world as there are human beings. Pessimists use the adage to argue the futility of trying to get men to come together in agreement upon matters relating to their affairs as a group. Optimists see in it merely another form of the proverb that variety is the spice of life. Persons of a practical turn of mind admit the wide divergences of thought but proceed to look for the elements in them which are capable of synthesis. Thus does mankind emerge from the caves and build cities. Individualism maintains its distinctness but society grows apace and collective functioning eliminates waste effort. Briefly, this is the process of civilization. Society is an organism. Group activities are necessary to its development. Because we are not all of one mind it has been possible to produce so great a wealth of invention, of industry, of science, and of art. The differences of opinion will continue. But, more and more, certain basic thoughts will enter into the brain fiber of the people. Every epoch of history marks an advance toward more compact integration of common interests.

Beneficial To Members And Public.

That we are even now on the threshold of a new epoch, socially and industrially, is the conviction of numerous observers of events. However greatly opinions may vary as to the outcome of the present movements throughout the world, it is fairly clear that profound changes are impending. Wilbert G. Wise, president National Warm Air Heating and Ventilating Association, calls attention to them in his address to the sixth annual convention of that body at Columbus, Ohio, June 11, 1919, the text of which is published in the present issue of AMERICAN ARTISAN AND HARDWARE RECORD. He declares that a new order of things seems to have taken place.

"Business in the future will be transacted on a firmer and more equitable basis," in the opinion of President Wise. "The average man has taken a different view of life. He is thinking differently, acting differently, and has resolved to live differently. He is beginning to enjoy the contentment of home ownership, and is not satisfied with merely a house to live in, but a home, equipped with conveniences and comforts that will bring happiness and contentment and establish a standard of living that will of necessity bring about a great increase in the use and installation of heating plants, without which no home is now complete."

President Wise's address reveals an aspect of trade organization which deserves wider recognition. Not only does he point out the advantages of his association to its members, but he also indicates some of the phases in which it affects all the people by promoting happiness and contentment. In some form or other, happiness is the object of all human striving. An essential element of happiness is contentment. Physical comfort, healthful conditions in the home, right heat-

ing and ventilating, are all interlaced. An association which has the vision to perceive its function as something more than service to its members and which developes a keen social consciousness in its ranks is doing a big work for industry and citizenship.

Symposium on Prices.

A SYMPOSIUM OF STATEMENTS by some of America's leading men has been made by the Information and Education Service of the United States Department of Labor, dealing with the trend of prices. These men are not provincial in their views. Their interests are national rather than local. It may reasonably be assumed that they do not approach the subject with any strongly established prejudices. Therefore, their opinions are of more than ordinary importance to the merchant who seeks guidance in the present state of business. Thus, for example, James B. Forgan of the First National Bank, Chicago, Illinois, is quoted as saying that "in all lines of industry, to make a fair profit, selling prices must be in proportion to the cost of production, including the enhanced cost of labor. This fact should be recognized in buying as well as in selling. There exists in the world today, and there will exist for some time to come, a tremendous latent demand for goods and service and a relative shortage of workers caused by the war. The high cost of living has not yet begun to recede, and it would be an erroneous policy at present to attempt to cut prices at the expense of labor."

A warning against the cry for lower prices is given by Major General George W. Goethals whose brilliant achievements in the building of the Panama Canal are still fresh in the memory of the American people. He declares that "the manufacturer, employer, or individual who is selling his own labor, brains, or product at a high though reasonable price should not expect to buy cheaply from others. Let us be careful, in our cry for lower prices, not to forget that permanent improvement of living conditions is effected only by increased efficiency of the forces of production. And experience shows such increase of efficiency is at best a slow process, a process of years and perhaps decades."

One of the closest students of affairs in our country is Jacob H. Schiff of the great New York banking house of Kuhn, Loeb and Company. He does not look for any rapid decline in prices. "After all," he concludes, "it is not a question so much of price each of us has to pay for what we want, but as to what relation this price bears to our own income. Those millions of men and women whose incomes have grown apace with or ahead of the general price advance have abundant cause for satisfaction. Yet how often do we not hear these same people unwittingly complain of high prices, their attitude being that high prices is a privilege that belongs to themselves only, in the selling of their own labor or wares, but has no place in their scheme of buying."

It needs to be pointed out that there is practically no real difference between concurrently high prices and high wages and low prices and low wages. The real test of the dollar's value is what it will buy in commodities. Coleman du Pont wisely indicates this fact in his statement that "we are going through a transition period, which has followed and will follow every economic disturbance. Will wages be higher when things settle down than before? Yes, I think they will, because wages have continued to advance in this country year after year, but the cost of living and the desire for luxuries, too, have advanced so that relatively the condition is the same."

Years of experience in compiling commercial reports give weight to the statement of Franklin T. Miller, the New York publicist. He says, "it appears that we have arrived at a new price level, and that it is certain there will be no immediate and radical recession. In the building industry there are signs of even higher prices because building materials as a group during the war advanced less than any other group, and because there is a shortage of a year or more's production.

You will assist your country in the struggle toward normal peace-time activity by possessing yourself of all the facts bearing on the economic situation and discussing them fearlessly in private and public. Write what you think; publicity will hasten a general understanding of the situation. The shortage of commodities will never be made good while, as a Nation, we suspect or investigate one another as profiteers, not realizing that we are all, to a greater or less degree, moved by world causes beyond our individual and national control. We are not responsible for the world war; for the incident world shortage of men, materials, and plant; for the heavy tax burdens, or for the world's imperfect political machinery in meeting and adjusting these matters. But we can overcome all these by working together with faith in one another for increased production."

Many deductions may be made from the foregoing statements. The chief inference is that it is wise for the retailer to keep his stocks up to the level of demand. That is to say, he ought to buy goods far enough in advance so that deliveries will be made in time to supply the wants of his customers. In the oil stove trade, for illustration, some dealers deferred buying this spring and are now unable to get certain types of oil stoves in time for June and July business.

Advertising And Cost of Production.

THE DICTIONARY DEFINES a paradox as that which in appearance or terms is absurd, but yet may be true in fact. Examples of it are common in business. Some folk there are whose mental processes are thrown out of gear by encounter with the paradox in advertising that publicity holds down prices. It seems absurd to say that spending thousands of dollars to make a commodity known to the people lessens the cost of its production. Many merchants believe that the thousands thus expended are added to the price of the commodity. Indeed, so confident are they in their point of view that they are not averse to arguing the matter. They think that they drive their opponents into a blind alley when they propound the query: "Who pays for the advertising?"

The paradox is shorn of its apparent absurdities by a simple comparison. Before railroads were built, freight was hauled by teams of horses or mules. To

transport a ton of goods from Chicago to Denver cost a great deal more than it does today. Yet millions of dollars were spent to build railroads to take the place of horses and mules and wagons. Freight is cheaper now because the volume of goods hauled over steel rails by powerful locomotives is bigger. The operating expenses are distributed over a greater number of articles. It is precisely the same difference which exists between advertised goods and non-advertised goods. Advertising lowers the cost to the consumer by increasing the volume of business, thus spreading the overhead expenses of production to a larger number of units of the commodity.

RANDOM NOTES AND SKETCHES.

By Sidney Arnold.

The visionary is always the forerunner of a new era. Jules Verne described the submarine in his two novels, "Twenty Thousand Leagues Under the Sea" and "The Mysterious Island," long before its invention. Dreams must precede realities. I like to bring to the attention of others ideals which help toward betterment and which some day will be transformed into actualities. That is why I am setting forth here the vision of the ideal city as phrased by Mayo Fesler, Greater Trenton:

A city, sanitary, convenient, substantial; where the houses of the rich and poor are alike—comfortable and beautiful; where the streets are clean and the sky line is clear as country air; where the architectural excellence of its buildings adds beauty and dignity to its streets; where parks and playgrounds are within reach of every child; where living is pleasant, toil honorable, and recreation plentiful; where capital is respected, but not worshipped; where commerce in goods is great, but no greater than the interchange of ideas; where industry thrives and brings prosperity alike to employer and employed; where education and art have a place in every home; where worth and not wealth give standing to men; where the power of character lifts men to leadership; where interest in public affairs is a test of citizenship and devotion to the public weal is a badge of honor; where government is always honest and efficient and the principles of democracy find their fullest and truest expression; where the people of all the earth can come and be blended into one community life, and where each generation will vie with the past to transmit to the next a city greater, better, and more beautiful than the last.

* * *

A. W. Crotsley of the Chicago office of the Wheeling Corrugating Company, Wheeling, West Virginia, tells about a typical office boy, freckle-faced, red-headed and keen as a trap.

He had been employed by a well-known firm of lawyers for three months. There wasn't any question about his ability. He was a smart boy; but he reached the point where he got entirely too smart, and the big boss decided to decorate him with the Order of the Can.

After he had been paid off a week in advance and told to vamp while the vamping was good, George paused at the desk of the junior partner of the firm, for whom he had always shown a distinct preference.

"Well, so long, Mr. Blank," said the irrepressible one.

"Why, where to, George?"

"Oh, I'm done! 'Sall over. The old man just give me de pink slip and I'm off."

"Well, that's too bad, George. You've been with us three months and I'd hoped we'd make a lawyer out of you."

"'Sall right, Mr. Blank; I should worry," piped the optimistic George. "Tell ye de truth, I'm sorry I learned de *aamn* business."

* * *

Speaking about the eagerness of our soldiers to return home, E. P. Miller of the Lennox Furnace Company, Marshalltown, Iowa, relates a story about three darky doughboys who were discussing decorations during a little smoker in the mess hall in Coblenz one evening. The biggest and brawniest of the three confessed to a secret hankering for "this here cross they call the Craw dee Gaire."

"Huh," snorted another in deep contempt, "you all don't know crosses. Give me this Distinguished Service Cross, there's the cross for a life sized nigger."

A heated altercation ensued, and they appealed to the third darky for help. He thought very hard for a minute and then said solemnly, "I think I'd like this Cross de Ocean about the best of all."

* * *

Thrift may be practiced in various ways. Often the most unpromising things can be turned to advantage, says my friend James Doherty, Chicago manager and vice-president Utica Heater Company, Utica, New York. He tells of an associate who remarked:

"Tomorrow's my birthday and I shall get the usual very welcome box of cigars from my wife."

"Welcome? Hugh! I'll bet you throw them away."

"Not much, I don't! I give them to my friends. They remember the horror and later when I offer them a cigar that's really good they pass. I tell you wife's gift is dozens of dollars in my pocket every year."

* * *

One often hears of troubles being magnified, but seldom of joys being exaggerated. Yet it is much more sensible and healthful to emphasize happiness than to dwell upon misery. Business runs more smoothly when lubricated with pleasant thoughts and words. I like the way W. E. Fitch puts the matter in the following lines:

Don't Double Trouble.

This old world is full of trouble,
'Nuf and some to spare—
Some folks try to see it double
Huntin' for their share;
With their "spy-glass" all adjusted
Noses out of joint—
All the joys of life are "busted"
To their woes anoint.

This old world is full of gladness,
'Tis now, sure's you're born—
'Taint no use to hunt for sadness,
It's the roses' thorn:
Thru the clouds the sun is shinin'
All the livelong day—
Gold is found thru careful minin',
Let's get ours that way.

UP TO THE MINUTE NEWS SIFTINGS

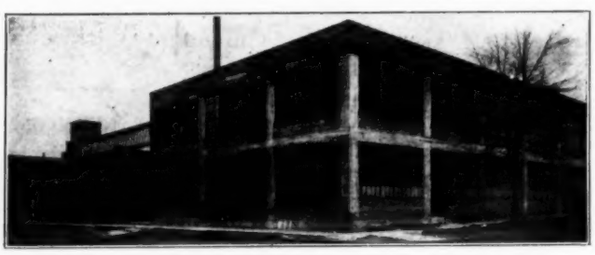
GETS PATENT FOR A STOVE POLISH.

Cathleen Devlin, Providence, Rhode Island, has secured United States patent rights, under number 1,304,163, for a stove polish described in the following:

A stove polish consisting of the following ingredients in the following proportions, viz.: 1 pound pure graphite, 2 ounces turpentine, ¼ ounce of boiled linseed oil, 1 ounce of asphaltum, 1/20% of citronella, 1/10% of amylacetate, and a perfuming ingredient.

TURNS OUT HIGH GRADE PRODUCTS.

The illustration herewith shows the plant of the Cope-Swift Company, Incorporated, at 41-49 McDougall Avenue, Detroit, Michigan. This is the exterior view of the main building of the works which is constructed along modern lines of reinforced concrete. The structure is two stories in height and is 60x94 feet in plan. Provision has been made for two additional stories that may be added when such a thing becomes necessary. The



Plant of the Cope-Swift Company, Incorporated, Detroit, Michigan.

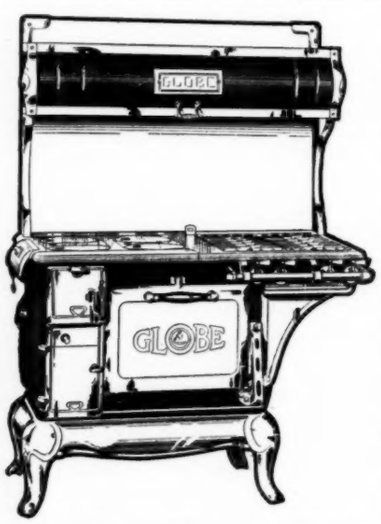
Cope-Swift Company, Incorporated, makes a business of keeping up-to-date and its stove patterns are always modern in every detail. The wood and metal pattern shops of the plant are fully fitted out with the latest type of machines. Such equipment makes it possible for the company to turn out better work in a shorter time. The foundry is of the steel, concrete and tile roof type and is supplied with the latest mechanical devices for maintaining its productivity at a high level of efficiency. Electric power is used throughout with individual motors where advisable. Stove makers will find it to their interest to communicate with the Cope-Swift Company, Incorporated, of 41-49 McDougall Avenue, Detroit, Michigan.

EDISON GIVES HIS IDEA OF HAPPINESS.

"What do I consider the nearest approximation to happiness of which the present human nature is capable?" asks Edison. "Why, living on a farm which is one's own, far from the hectic, artificial conditions of the city—a farm where one gets directly from one's own soil what one needs to sustain life, with a garden in front and a healthy, normal family to contribute those small domestic joys which relieve a man from business strain."

WITHSTANDS RUST AND CORROSION.

There are many special features in the Globe stoves and ranges made by the Globe Stove and Range Company of Kokomo, Indiana. All electric welded Ingot Iron Globe Range bodies are insured against destruction from rust or corrosion for a period of twenty-five years. The Company states that ingot iron is pure iron rolled in sheet form, polished smooth, and dark rich blue in color. It is said to withstand rust and corrosion forty-five times as long as charcoal iron, and sixty-four times as long as steel. In the electric welding process, the sheets are drawn very tightly together, thus making the body heat and gas tight. The Globe Ranges are sanitary and exceedingly well constructed, there being no unsightly rivets to loosen or to collect dust and grease. Duplex grates are provided for all Globe Ranges which can be used for hard coal, coke, soft coal, or wood. A change from coal to wood or wood to coal is made by just reversing the grate by half a turn of the crank shaker. These ranges are fitted with two styles of reservoirs, cast white enameled and copper contact. Both are large, but the copper contact has a greater capacity. When the housewife requires more hot water than the enameled reservoir will provide, then the copper contact is recommended. Further details may be obtained from the Globe Stove and Range Company, Kokomo, Indiana.



Globe Range, Made by Globe Stove and Range Company, Kokomo, Indiana.

WAIT FOR THE TIDE TO TURN.

Out of the wisdom of much experience Harriet Beecher Stowe counseled that when you get into a tight place and everything goes against you, till it seems as though you could not hold on a minute longer, never give up then, for that is just the place and time that the tide will turn.

THE WEEK'S HARDWARE RECORD

Of Interest to Manufacturer, Jobber and Retailer

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing western hardware and metal prices corrected weekly. You will find these on pages 64 to 69 inclusive.

MISSISSIPPI RETAIL HARDWARE AND IMPLEMENT ASSOCIATION ISSUES PROGRAM OF CONVENTION.

A well-balanced arrangement of sessions has been devised for the convention of the Mississippi Retail Hardware and Implement Association, which is to be held July 8, 9, and 10, 1919, in the Mississippi Agricultural and Mining College, located in the town bearing the name Agricultural College, Mississippi. Financing problems, fire insurance, accounting systems, and other important topics are scheduled for discussion. The program is as follows:

Program of Convention of Mississippi Retail Hardware and Implement Association, to Be Held July 8, 9, and 10, 1919, at the Mississippi Agricultural College.

Tuesday, July 8.

10 a. m.

Registration of members.
Payment of dues.
Distribution of badges.
Greetings of members, friends and visitors.

1:30 p. m.

Call to order, G. S. Turner, President.
Song—America.
Invocation by the Reverend J. D. Ray, Pastor Baptist Church, Starkville.
Words of Welcome by President W. H. Smith, President A. & M. College.
President's Annual Address, G. S. Turner.
Appointments of committees.
Secretary's Report, D. Scoates.
"Mutual Fire Insurance," by Leon D. Nish, Elgin, Illinois, Secretary Illinois Hardware Association.
"National Accounting System," by H. P. Sheets, Argos, Indiana, Secretary National Hardware Association.

7:30 p. m.

"Social Radicalism," by Professor J. C. Herbert, Professor History and Economics, Mississippi A. & M. College.
Address, by George R. James, President James and Graham Wagon Company, Memphis, Tennessee.

Wednesday, July 9.

9 a. m.

"The Dealer's Financing Problems," by R. S. White, Chicago, Illinois, American Steel & Wire Company.
Discussion.
Trade Adjustments led by B. D. Avery, Crystal Springs.
Trade Relations led by L. E. Barr, Lexington.
Question Box led by C. L. Armstrong.

2 p. m.

Trip around the college.

3 p. m.

Tractor demonstration.

8 p. m.

Banquet.

Thursday, July 10.

9 a. m.

"Trade Conditions and Business Tendencies," by H. P. Sheets, National Retail Hardware Association.
"Mail Order Competition," discussion led by J. A. McAmis.
Question Box, in charge of C. L. Armstrong.

1:30 p. m.

Business Meeting.
Election of Officers.
Report of Committees.
New and Unfinished Business.
Final Adjournment.

SECRETARY DESCRIBES PLANS FOR NATIONAL RETAIL HARDWARE ASSOCIATION CONVENTION.

In a circular letter sent out to the delegates of the National Retail Hardware Association convention, enclosing a tentative program, Secretary Herbert P. Sheets describes the plans which have been formulated for making the meeting distinctive and profitable. The annual gathering of the Association is to be held June 24, 25, 26, and 27, 1919, in the William Penn Hotel, Pittsburgh, Pennsylvania. The program for the meeting has been devised with the intention of getting maximum values out of the convention. Secretary Sheets declares:

"This program follows somewhat distinctive lines in this, that the usual addresses of welcome and responses are eliminated. Primary attention will be given to association problems, in an effort to determine policies which will best advance the interests of the membership. But broad business problems will also have consideration.

"The success of the meeting, its value to the trade, will be measured largely by what the delegates themselves put into it, because while a few outside speakers will discuss timely business subjects, the delegates will do most of the talking.

"It is therefore urged that you give earnest thought to all the questions outlined and come prepared to give the benefit of your experience and judgment, in deciding policies by which the scope of our organization work may be effectively extended.

"Though we are going to Pittsburgh for business and shall work consistently during all the convention sessions, ample relaxation will be provided for the

men, and the ladies of the party will have a full measure of entertainment.

"A special feature will be Friday's inspection of steel and wire making processes, as the guests of the American Steel and Wire Company. Special train will leave Pittsburgh about 10:00 a. m. for Donora, where is located one of the company's most complete plants, and delegates will be given opportunity to study every process from the reduction of the ore to the completion of the finished products.

"While the men are at the steel plant the ladies will visit the pure food factory and be the luncheon guests of the H. J. Heinz Company. To inspect the home of the "57 Varieties" has doubtless often been the wish of every housewife, and we are sure the ladies will greatly enjoy this feature."

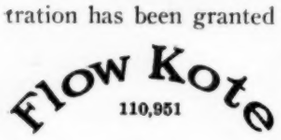
MAKES WATERPROOF WEATHERSTRIPS.

Many advantages are claimed for the Burlington Weatherstrips, manufactured by the Burlington Blanket Company, Burlington, Wisconsin. It is made of heavy, compact, brown mixed reinforced felt, with a tough waterproof paper back. It will not stretch while applying, snow and rain can't cause it to sag between the tacks, and let in the wind and cold, as ordinary flimsey strips do. It will stay smooth and tight all winter.

It's a distinct inovation in flexible weatherstrips, not only in the exceptional quality of the Burlington Strip itsel, but i nthe fact that proper size and shape of tacks, together with metal thumb guard for pushing in the tacks, are included free. No hammer is needed. It is convenient to apply, everything being furnished. Full particulars to dealers may be obtained by writing to the Burlington Blanket Company, Burlington, Wisconsin.

TRADE-MARK IS REGISTERED.

Under serial number 110,951, United States registration has been granted to the E. I. du Pont de Nemours and Company, Wilmington, Delaware, for the trade-mark shown in the accompanying illustration. The Company claims use since March, 1912, and the claim was filed May 17, 1918. The particular description of goods is ready mixed paints.



GOVERNMENT WANTS HARDWARE MAN TO CONDUCT TRADE INVESTIGATION.

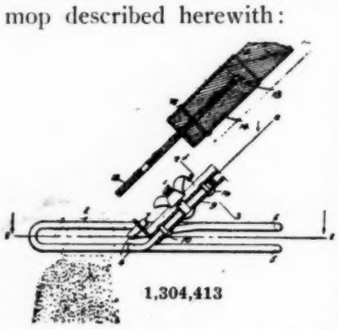
A letter addressed to the American Hardware Manufacturers' Association by Hugh D. Butler, Division of Foreign Investigations, Department of Commerce, Washington, D. C., states that the Government wants a hardware expert to conduct a study of the markets in the Far East. Mr. Butler says:

"We wish to bring it to your attention that we are looking for a man especially fitted to conduct hardware investigation in the Philippines, Dutch East Indies, Straits Settlements and British India, during the year ending July 1, 1920. The Bureau realizes that your association naturally will take a special interest in this investigation and will be very desirous of getting an expert whose report will be of tangible value to the hardware industries of this country. In order that this work may be started at the earliest date possible it is necessary that prompt action be taken in bringing this to the attention of all concerns and individuals who might be in a position to recommend the proper person for this work.

"Anyone interested can get an application form fro mthis Bureau at any of its offices and those applicants who seem to have the proper qualifications will be admitted to the examination."

PATENTS A FLOOR POLISHING MOP.

Under number 1,304,413, United States patent rights have been granted to Alexander Traill, Vancouver, British Columbia, Canada, for a floor polishing mop described herewith:


1,304,413

A floor polishing mop head, comprising in combination, a central attaching portion provided with means for attachment of the same to a handle, a frame of wire doubled vertically from each end toward the center and the doubled ends doubled horizontally from the center toward one another and in the same plane each doubled end bent outward and backward beyond the end of the central loop and then outward and forward to bring the two free looped ends into proximity, the central loop and the adjacent ends of the wire being secured to the central attaching portion, and means for removably securing a handle to the central portion

INCREASES ITS CAPITAL STOCK.

In order to provide for larger operations, made necessary by increasing business, the directors and officers of the Farmers' Fork and Hoe Company have decided to increase the capital to $1,500,000, divided equally into preferred and common shares. The general offices of the Company are in Pittsburgh, Pennsylvania. W. T. Johnson of Johnson Sales Company, Pittsburgh, Pennsylvania, brokers and selling agents for hardware manufacturers, is its president.

SECURES PATENT FOR SHOT SHELL.

Julian S. Gravely, New Haven, Connecticut, assignor to the Winchester Repeating Arms Company, New Haven, Connecticut, has obtained United States patent rights, under number 1,304,962, for a shot shell described herewith:

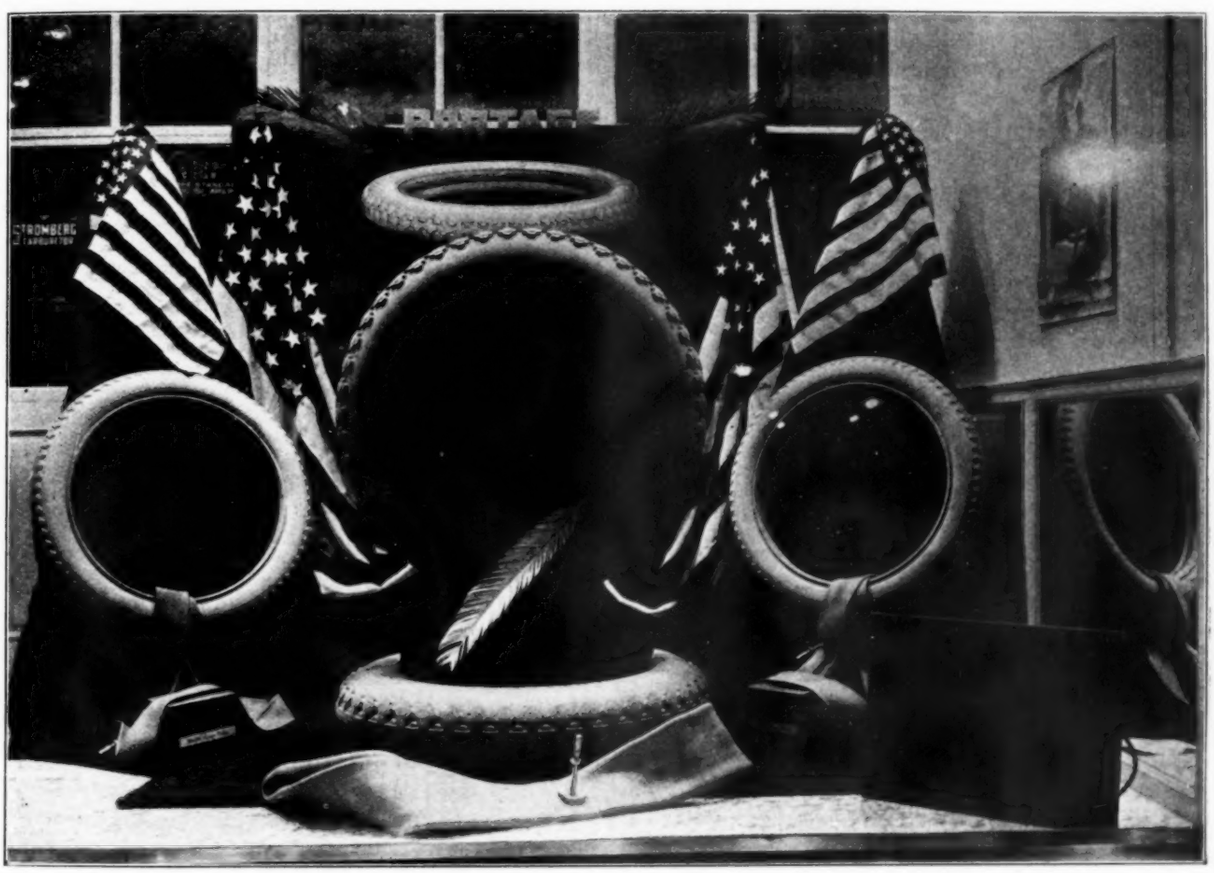
1,304,962

A shot-shell having a shot of the shot-charge provided with a composition adapted to be ignited by the concussion between the shot consequent upon firing the shell and to burn and mark the flight of the shot-charge.

PRINCIPLES AND EXAMPLES OF GOOD WINDOW DISPLAYS.

WINDOW EXHIBIT OF TIRES AND INNER TUBES GIVES CLEAR EVIDENCE OF CARE AND TALENT.

One of the most difficult results to achieve in art is simplicity of expression. The natural tendency is toward repetition and multiplicity of detail. Indeed, this is true of every form of expression. Listen, for example, to a man describing some happening in which he took part and you will notice that he tells the same thing over and over again, each time adding some trifling particular after the fashion of the three-volume novels of the Victorian period. The truly great artist accomplishes his purpose by subordinating his material to a single idea. He leaves much to the imagination, as in Rodin's sculpture of "The Thinker" and Leonardo da Vinci's "Mona Lisa."



Window Display of Tires and Inner Tubes, Arranged by H. C. Crabb for Belcher & Loomis Hardware Company, 83 to 91 Weybosset Street, Providence, Rhode Island.

What has all this to do with a window display of tires and inner tubes, it may be asked. Isn't the comparison far-fetched? It is not. Except to the self-centered few who seek to divorce art from life, there is no department of human activity, no branch of industry, to which the general principles of æsthetics do not apply. The romance of the tire is as rich in possibilities of imagination as the high-prowed ships of the Vikings. To glide swiftly along the roads on rubber enclosed cushions of air is almost a thing of magic as wonderful as any of the marvels in a fairy tale. The prairie schooner of the pioneer moving slowly toward the West is dull and prosaic in contrast with the high-powered motor car climbing the steep slopes of the Rockies on rubber tires which soften the roughness of the trail to the ease of a rocking chair.

Lightness, buoyancy, speed, and the luxury of smooth journeyings are expressed in the window exhibit of tires and inner tubes arranged by H. C. Crabb for Belcher and Loomis Hardware Company, 83 to 91 Weybosset Street, Providence, Rhode Island. The feather pointing upward in the central tire of the display is a symbol whose significance is quickly made apparent. Being in the foreground and free from the distraction of details, its suggestiveness is enhanced to the point of eloquence. The simplicity of this arrangement merits unstinted praise. It would have required less thinking and care to fill the window with tire accessories, such as pumps, vulcanizers, anti-skid chains, and the like. But the effect would have been much less distinct in its impression upon the

passer-by. Talent, care, and an artist's sense of values were needed to exercise the restraint so evident in this display. The designer is to be congratulated upon his achievement. The sales record of the store proves that his taste and judgment were justified from a business point of view.

EXPLAINS THE NEED FOR A STATE CHAMBER OF COMMERCE.

By reason of its greater freedom from the influence of small and parochial interests, a state organization of business men can do much to promote the common welfare of the merchants and manufacturers in all lines of industry. With this thought in mind plans are under way for the establishment of a State Chamber of Commerce in Illinois. A preliminary organization has been formed, with Truman T. Pierson of Quincy, Illinois, as organizer. Mr. Pierson explains the need and benefits of the proposed chamber of commerce as follows:

The State Chamber of Commerce should be an organization with a President of the kind and character to vision big things for the commonwealth and evolve plans for carrying them out. Then there should be a Board of Directors of approximately sixty men, representing all classes of business, from one end of the State to the other.

In New Jersey they have an effective plan embracing various bureaus and committees, as well as representatives of the affiliated commercial, agricultural, and civic organizations of the State.

The State of Illinois Chamber of Commerce would have to be in the vanguard of the progressive development of the State at the outset or else it would die at birth.

The close of the war has created an enormous social, political ,and economic problem, which demands a swift and adequate solution.

A State Chamber of Commerce, properly organized, can do more to help in the solution of these problems than any other body now in existence, as it would not be seeking to serve any one selfish end, and yet it must not be thought for a moment that reflection is cast upon the very excellent organizations now in existence, many of them purely selfish and yet of a most laudable nature.

The Federal Government is the best evidence today of what it is to be too well organized or not to be well enough organized. Over-organization is as bad as, if not worse, than under-organization.

The average business man is the one who should be the warmest advocate of a State Chamber of Commerce. He is the man today—he can be called Mr. Common Citizen—who needs the support of a powerful State-wide Chamber of Commerce.

Organization purely for the benefit of capital or purely for the benefit of labor will not do for the average business man things which he would like to have done in his own way, but the Chamber of Commerce can be made to do these things and will do the greatest good to the greatest number.

The taxpayer is the man who must keep his ear to the ground and his nose to the grindstone for the years to come. The great war must be paid for.

Democratic Government was appealed to to save the world to Democracy. Democratic Government won the war and saved the world.

Now the extension of the prerogatives and functions of the Government such as ours into new and wider fields will demand much of the world and much of the State in the way of increase of expenditures. Naturally this money must come from taxes and as the people pay the freight, the people should have, and will want to have, a greater voice in affairs of State, and a Chamber of Commerce having proved in smaller communities that it is the correct body for securing the things which communities need, why shouldn't a State Chamber of Commerce secure for the business men the state of things they need?

Properly organized and conducted, a State Chamber of Commerce would be of great assistance to the departments of the State government and to the Legislature. Not desiring for a moment to give the idea that the State Chamber of Commerce would constitute itself a board of guardians to make its headquarters at Springfield for the sole purpose of watching the Legislature, but by cooperating with all State Bodies and State Authorities, much good would be accomplished by and for the State, is the thought to be conveyed by the idea of a State Chamber of Commerce.

The era of Industrial Democracy is upon the land, and the working man, so-called, feels himself a mighty big factor in the situation. These new ideas of Industrial Democracy, both on the part of capital and on the part of Labor, must be carefully worked out, for this is neither a community of and by Capital, nor of and by Labor, but as we usually discover when there is a strike the people who derive the least benefit and the most harm from any extraordinary activity on behalf of the contending parties are the people who pay the freight, the common people, or the average business man.

Industrial Democracy having taken firm root, why shouldn't the State Chamber of Commerce help in the development and growth of the Tree?

There must be peaceful and helpful cooperation of both Capital and Labor, for these are the foundation stones of the era of new prosperity, which we know is not far distant.

There must be a body of level-headed business men, who are neither politicians nor theorists, who will have advice and counsel to give when it comes to the development of universal and equitable taxes, and construction of public works, economical disposition of the necessities of life, protection of the savings of people from wild cat investments, etc.

Every line of endeavor in Civic, Industrial and Commercial, as well as professional lines, must be represented in the State Organization.

It is up to our business men and business organizations to have membership and, therefore, a voice in the State Chamber of Commerce. The doors of the organization will be open to all and the program of work will provide something for all to do.

If you have a clerk who is a mind reader, you need not bother to inform him about the new goods in stock or about the advertising you are doing.

MAKES ADDITIONS TO PROGRAM.

Three additions have been just made to the tentative program of the National Retail Hardware Association convention, scheduled for June 24, 25, 26, and 27, 1919, at the William Penn Hotel, Pittsburgh, Pennsylvania. The first draft of the program was published on pages 17 and 18 of last week's issue of AMERICAN ARTISAN AND HARDWARE RECORD. The additions are, first, an address at the afternoon session of Wednesday, June 25, by the Honorable William B. Colver, Chairman Federal Trade Commission, Washington, D. C., on the subject of "Competition and Co-operation." The second addition is a symposium of suggestions by State secretaries as to methods and plans by which organization work may be made more effective. This is to be on the program of the Thursday afternoon, June 26th session. The third addition is for Friday, June 27, and consists of a special visit to the Donora plant of the American Steel and Wire Company, which will afford delegates opportunity to study all the processes of steel and wire making from reduction of ore to the drawing and galvanizing of the wire, and the making of nails and woven fence.

CONFORMS TO EXACTING STANDARDS.

File Made by the Delta File Works, Philadelphia, Pennsylvania.

Files and rasps for all purposes are manufactured by the Delta File Works of Philadelphia, Pennsylvania. All Delta files are made of refined cast steel which has been tested and examined by experts before it is permitted to be made up. The statement has been made that mechanics who really know steel and its properties can take a good file and after treating it properly, make knife blades from it. Such an operation, however, can not be performed except when the file in the first place is of the very highest quality. The trade-mark of the Delta File Works has been found in many shops where this process obtains. The Delta File Works is one of the companies that knows the value of high grade material and is aware of the fact that no product is better than the material from which it is made. All Delta Files are backed by a written guarantee of absolute satisfaction, therefore dealers need have no fear of handling these products. In buying Delta files, they take no chances as there is a file made in any style and shape that may be wanted. The files are known for their deep teeth, cutting efficiency, and lasting quality. Dealers interested will find it to their advantage to address the Delta File Works of Philadelphia, Pennsylvania, and the Company will send full particulars and latest catalog.

LISTS PRECAUTIONS AGAINST FIRE.

Hardware merchants are urged, in the interest of their stores, to take precautions against fire. In order to remind them of the things which they must avoid, the Fire Insurance Committee of the Minneapolis, Minnesota, Association of Credit Men has issued the following list of fire negatives:

1. Don't allow rubbish to accumulate in basement or warehouse.
2. Don't put ashes from heating plants in barrels or wooden boxes. Remove them daily.
3. Don't allow flexible electric lamp cords in contact with any metallic objects.
4. Don't forget where stoves are used to see that the floor beneath is properly protected against accidental dropping of live coals.
5. Don't neglect to have flues and smoke pipes cleaned at frequent intervals when soft coal is used.
6. Don't neglect to keep stock of matches in metallic container. This refers to shelf stock.
7. Don't allow electric lamps to remain in contact with any combustible material.
8. Don't use tissue paper in connection with electric lamps for decorative purposes.
9. Don't allow sweeping compounds containing waste and litter from the floor to be swept into the corner and left there.
10. Don't neglect to have approved chemical extinguisher kept in a place where contents will not freeze.
11. Don't neglect to keep books of record in a fireproof safe at night. In case of fire, prompt adjustment of your claim will depend upon these records.
12. Do not use matches or an open light to see by when you draw oil or gasolene.

FAVOR YOUR OLD CUSTOMERS FIRST.

Remember your old customers first. When conditions are such that it comes to choosing between your old customers and the new ones that you want to make sure of, supply the old ones first. When the new ones see that such is your policy, they will understand that if they become steady customers they will get the same faithful services.

HAS THREE SELLING FACTORS.

In the accompanying illustration is shown the safety revolver, made by Iver Johnson's Arms and

Safety Revolver, Made by Iver Johnson's Arms & Cycle Works, Fitchburg, Massachusetts.

Cycle Works, of Fitchburg, Massachusetts. There are three Iver Johnson selling factors, namely: Safety; protection and dependability. The Company states

that the safety feature opens up a large field of possible business among those who have never had a revolver in the house on account of fear of accidents. On the Iver Johnson revolver, it is possible to "hammer the hammer" without discharging the cartridge, thus making it absolutely safe. The firearms made by this Company have piano wire, drawn-tempered springs and are simply and durably constructed. The reputation of the Iver Johnson revolvers makes them easy to sell, particularly for home protection. The Iver Johnson's Arms and Cycle Works, 354 River Street, Fitchburg, Massachusetts, will furnish catalog and complete information on firearms, bicycles and motorcycles to anyone writing for them and dealers may also secure advertising and selling helps.

HELP IMPROVE YOUR COMMUNITY.

How do you like the community you are living in? Are there not some things that need correction? Are you helping to get them corrected? Are you doing your share to make your community a better place to live in this year than it was last year? Why not begin now?

OPPORTUNITIES FOR FOREIGN TRADE PRESENTED BY BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

The Bureau of Foreign and Domestic Commerce through its Special Agents, Consular Officers and Commercial Attachés is receiving information of opportunities to sell hardware and kindred lines in several foreign countries. Names and locations will be supplied on request to the Bureau in Washington or its District Offices. Such requests should be made on separate sheets for each opportunity, stating the number as given herewith:

29556.—A trading firm in Esthonia desires to receive quotations on hardware and tools for carpenters, shoemakers, blacksmiths, etc.; machinery and tools for metal and woodworking industry and for working iron sheets, etc.; agricultural machinery and implements, etc. Catalogues and samples are requested. Reference.

29578.—An agency is desired by a man in Spain for the sale of knives, forks, spoons, cutlery, razors and penknives. Correspondence should be in Spanish. Catalogues in Spanish and price lists are requested. References.

29583.—A firm in Brazil desires to purchase on own account hardware, agricultural implements and machinery, automobiles, trucks and supplies, etc. Quotations should be given f. o. b. New York. Payment, cash against documents or 90 days, according to terms offered. Correspondence should be in Portugese, Spanish or French. References.

29589.—A traveling salesman of Smyrna, Turkey, who has been in the United States for several years, is soon to sail for the Near East and desires to secure the representation in Turkey, Greece, the Balkans, and Egypt, of agricultural implements, builders' hardware, tubes and pipes of iron, copper, and brass, solder in bars and blocks, tin, paints and varnishes, etc. Correspondence may be in English. References.

29591.—The purchase of hardware, agricultural tools and general machinery is desired by a corporation in this country having large estates in Bolivia and Brazil. Terms, cash payments. References.

29595.—The purchase of seamless copper tubes, copper bars, copper sheets, sheet iron, black sheets for enameled ware, galvanized sheets, and metals in general, is desired by a firm in Spain. Quotations should be given f. o. b. American port. Payment through bank in New York. Correspondence may be in English.

29597.—An official of an export house in this country, having trade connections in northern Europe, is about to sail for Denmark. Manufacturers and producers desiring to be represented on a commission basis are requested to communicate with him. Reference.

29609.—An agency for the sale of automobiles and accessories is desired by a man from Australia, who is visiting this country at the present time and desires to get in touch with manufacturers and exporters. Reference.

29619.—A firm in South Africa desires to purchase household articles, including hollow ware, enamel ware, cutlery, and electroplated ware, which are inexpensive and attractive for gifts. Reference.

29622.—A firm in South Africa wishes to purchase and secure an agency for wire netting, galvanized fencing wire, black bailing wire, barbed wire, and iron fencing standards of the "Bulb T" type. Reference.

COMING CONVENTIONS.

The Texas Hardware Jobbers' Association, Galvez Hotel, Galveston, Texas, July 11 and 12, 1919. R. F. Bell, Secretary, 320 Broadway, New York City.

National Retail Hardware Association, William Penn Hotel, Pittsburgh, June 24, 25, 26 and 27. Herbert P. Sheets, Secretary, Argos, Indiana.

Mississippi Retail Hardware and Implement Association, Agricultural College, July 8, 9 and 10, 1919. D. Scoates, Secretary, Agricultural College, Mississippi.

Minnesota Retail Hardware Association, St. Paul Auditorium, St. Paul, Minnesota, February 17, 18, 19 and 20, 1920. H. O. Roberts, 1030 Metropolitan Life Building, Minneapolis, Minnesota.

Ohio Hardware Association, Hotel Gibson, Cincinnati, Ohio, February 24, 25, 26 and 27, 1920. James B. Carson, Secretary, Dayton, Ohio.

RETAIL HARDWARE DOINGS.

Arkansas.

The Tappan Hardware Company, Helena, has increased its capital from $10,000 to $40,000.

Idaho.

Roy A. Gage has purchased the stock of the Lewiston Hardware Company at Lewiston.

Illinois.

Fire destroyed the Karlock Hardware Store at Hudson.

Iowa.

Ed Wertman has opened a hardware business at Rhodes.

Kansas.

The Houston Mercantile Company of Hunter has engaged in the hardware business.

Green and Son have bought the stock of B. F. Banker at Jamestown.

The Westfall Mercantile Company has engaged in the hardware and implement business at Westfall.

Minnesota.

C. E. Falk has bought a hardware business at Buffalo.

The Balaton Hardware and Lumber Company, Balaton, has been incorporated for $27,000 by G. A. Reinke, E. M. Dudrey and S. M. Truax.

A. K. Lukens has bought the Marr estate hardware business at Aitkin.

Missouri.

The Yoder Hardware and Supply Company, Neck, has been incorporated for $5,000.

Charles McGregor of the McGregor-Noe Hardware Company, Springfield, has disposed of his interest in the firm.

Nebraska.

A. G. Luken of Wynot has sold an interest in his hardware store to M. Simeon.

The Brown and Gray Hardware Company, Ord, is now owned by S. J. Brown.

North Dakota.

E. M. Gentry has bought the Larson hardware business at Courtenay.

The Hazelton Hardware Company, Hazelton, has been incorporated for $10,000 by A. A. Simmer and B. W. Thompson.

Oklahoma.

Emil L. Nurshi has sold his hardware store at Guthrie to G. C. Herrmann.

M. Howell has sold a half interest in his hardware and implement store at Carney and the firm will now be known as Rogers and Howells Hardware Company.

Washington.

M. B. Peterson has sold his hardware store at Tenino to L. A. McLean.

Wisconsin.

Edward K. Olson of Leeman has bought the Witthuhn hardware store at Shiocton.

The store of E. L. Webster and Son, Walworth, has changed hands, B. F. Schultz and brother buying the Webster interest.

F. S. Moore has sold an interest in his hardware store at Lake Geneva to Andrew L. Malsch and Arthur G. Bullock.

AUTOMOBILE ACCESSORIES SOLD BY HARDWARE DEALERS

The Shaw Manufacturing Company, Lynn, Massachusetts, has been incorporated for $100,000 to make automobile accessories. Ira D. Shaw, J. Alfred Bowie and Joseph E. Dozier are the incorporators.

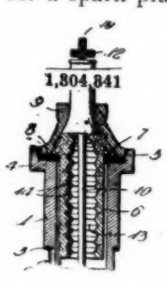
GIVES CAUSES OF ARMATURE TROUBLE.

Results of armature trouble may be low voltage, dim lights or undercharged battery. Should the armature windings be burned out the trouble may be due to improper regulation, soaked winding or prolonged return flow from the battery due to failure of circuit breaker contact points to open; a grounded winding is due to imperfect insulation.

Armature troubles may sometimes be located at the commutator segments, the solder attaching same having been thrown off by revolving, and this should be resoldered electrically. A defect will be indicated by an uneven torque, and in the case of a generator may be tested by disconnecting the driving mechanism, holding the cutout points closed, and allowing the generator to operate as a motor. If all right the armature will rotate evenly and in the same direction as when operating as a generator.

SECURES PATENT FOR SPARK PLUG.

Marion Mallory, Wichita, Kansas, has procured United States patent rights, under number 1,304,341, for a spark plug described in the following:



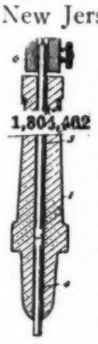
A spark plug comprising a vertically elongated, hollow, cylindrical shell open and screw-threaded at its lower end and provided at its upper end with a socket, a one-piece, vertically elongated insulator having between its ends an integral head secured in said socket, said insulator depending from said head into said shell substantially to the lower end of the latter and in spaced relation with the shell wall, said insulator having a longitudinal bore leading from its lower end wall into said head, the wall of said bore having superimposed V-shaped grooves giving thereto a zig-zag formation free of horizontal surfaces, an electrode secured in said insulator and extending through said bore, and a ground electrode extending from said shell.

USED OIL CAN BE RECOVERED.

In line with the movement for the reclamation of waste, a plan is suggested for recovering some of the unused values of lubricating oils taken from the crankshafts of cars. As a general rule, this oil would be of little use as a lubricant because of raw gasolene that is sure to find its way in. By letting the heavier particles settle and syphoning off the oil on top, much of this liquid can be reclaimed for use in rear axles, transmissions, etc.

INVENTS A NEW SPARK PLUG.

Under number 1,304,462, United States patent rights have been granted to Frank L. Dyer, Montclair, New Jersey, for a spark plug, described herewith:



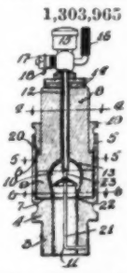
In a spark plug, an integral or one-piece porcelain or other refractory insulator therefor and a composite central electrode therein, comprising a nickel section located in the bore of the insulator and which is subjected to the effect of sparking, and a steel section connected thereto and also located in the bore of the insulator, the joint between the sections being located in the bore of the insulator, substantially as set forth.

FIT NEW CARBURETER CAREFULLY.

In fitting a new carbureter be sure that there is no looseness to cause vibration, because if there is it is quite apt to result in a broken flange. If vibration prevails, a small iron bracket should be installed from a nut on the frame of the engine to the instrument, which should steady it, also taking the strain off the intake pipe.

OBTAINS PATENT FOR SPARK PLUG.

Frank Robinson, Chicago, Illinois, has obtained United States patent rights, under number 1,303,965, for a spark plug described in the following:



In a spark plug of the class described, a sleeve member adapted to be threaded into the wall of the combustion chamber of an engine, an insulating core removably mounted therein, said insulating core having a combustion chamber therein larger than the passage in the sleeve, a spark terminal projecting into said enlarged chamber, a second spark terminal in said sleeve projecting upwardly into said enlarged chamber to a point below said first mentioned terminal, and means mounted thereon to keep said terminals clean.

VAPORIZER CAN EASILY BE MADE.

A serviceable home-made vaporizer may be constructed with wire cloth (of the same kind used in milk strainers), by placing a section of it on both sides of the gasket between the carbureter and the intake manifold. This serves to break up the fuel into finer particles, which operation will materially assist vaporization.

ADVERTISING CRITICISM AND COMMENT

Helpful Hints for the Advertisement Writer

The handy man around the house is certainly in favor of good tools with which to work. But he is not likely to be interested to the point of actual purchase in the long list of tools enumerated in the advertisement of Ludlow & Squier, which appeared in the *Newark Evening News*, Newark, New Jersey. Unmistakably, the emphasis of this advertisement is upon tools for the handy man about the house. It is, therefore, not probable that it will attract the notice of electricians, engravers, pipe fitters, carpenters, plumbers, tinners, and machinists to whom it is also addressed.

The Handy Man About the House
finds frequent use for tools in making light repairs. The trouble is too many buy poor tools and they can't do as good work as they ought.
We Sell Real Tools—High grade, the kind a first-class mechanic will prize—in big or little sets.
Auto Tools
Carpenters' Tools
Cement Workers' Tools
Contractors' Tools
Engravers' Tools
Electricians' Tools
Jewelers' Tools
Linemen's Tools
Machinists' Tools
Masons' Tools
Molders' Tools
Fipe Fitters' Tools
Plumbers' Tools
Slaters' Tools
Tinners' Tools
LUDLOW & SQUIER
Experts in Hardware That Stands Hardwear
97-99 Market Street

Skilled mechanics know that reputable hardware stores sell trustworthy tools. Consequently, in order to make an impression upon and induce them to come to a particular store to buy their tools, the advertisement must be something more than a classified index. It is sound publicity to let the people know that Ludlow & Squier sell tools in big or little sets for so many different craftsmen's use, and then to follow this general announcement with other advertisements giving prices and descriptions of particular sets of tools. But the trouble with the advertisement under discussion is that it starts off with an introduction which has little or no bearing upon the rest of the text. The man tipping his hat so politely at the top of the advertisement does not appear to have much connection with the subject. He is so vaguely conventional that he might serve with equal impartiality for an advertisement of liver pills, lawn mowers, tooth paste, typewriters, hair tonic, or floor varnish. This is not said in a spirit of flippancy, but to lay stress on the fact that an illustration of the commodity itself is more effective in hardware publicity than a picture such as the one in question.

* * *

The hunchbacked poet, Alexander Pope, crowded a lot of meaning into a few words when he coined the expression, "Damn with faint praise." Several things can be said in favor of the advertisement of Partridge Hardware Company, reproduced herewith from the *Mobile Register*, Mobile, Alabama. There is no thought of belittling its good qualities in saying that, as a general announcement of a stock of baseball supplies, it is graphic in wording and illustration. In order to avoid even the suggestion of an intention to "damn with faint praise," let it be stated at the outset that the advertisement in question gives evidence of talent capable of much better work. Almost half the space is occupied by pictures which are plain enough for the purpose. But it would be a better use of the space to reduce them to one illustration and employ the room thus made available for one or two statements of prices of particular articles. It will be noticed that the logotype of the firm's name is so badly blurred as to be almost illegible. It requires close scrutiny to discover that the word is "Partridge." A stranger would not be likely to take the trouble to decipher it, especially in an advertisement containing nothing specific. A blurred word leaves a blurred

Our Batting Average is High
We sell baseball goods of the finest make—stand back of them and guarantee satisfaction.
Our goods, as well as our service, have yet to be caught napping, between first and second.
Partridge
HARDWARE CO.

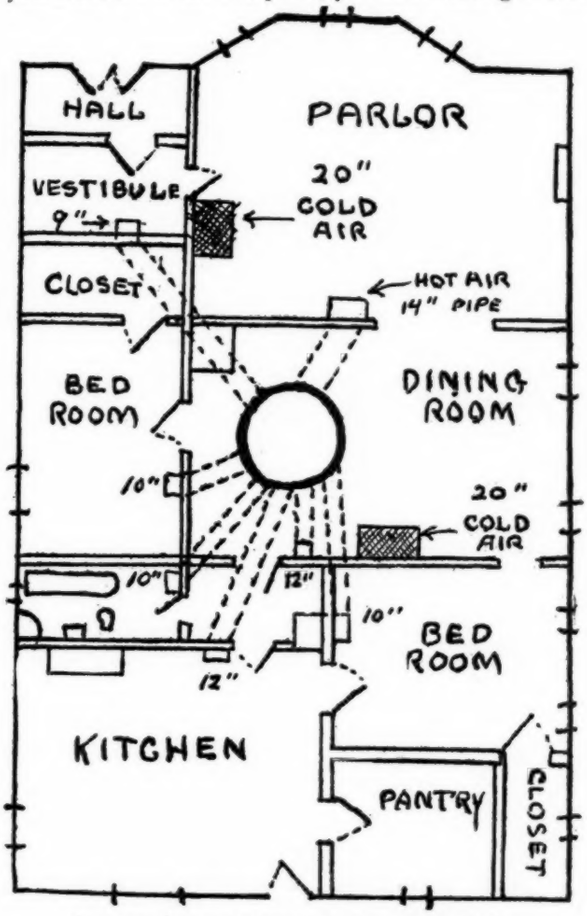
HEATING AND VENTILATING

GIVES IDEA AS TO INSTALLATION OF WARM AIR HEATER.

To American Artisan and Hardware Record:

In regard to the Emil W. Schober heating job shown on page 39 of your May 17, 1919, issue, I would place the warm air heater as indicated on the accompanying sketch.

My idea is to take the cold air from two points or more, whichever the case may be. If you take all your cold air from one place, you are creating a draft



Suggests Proper Location of Warm Air Heater.

along the floor of the house toward the cold air register from every direction for the reason that every bit of air in circulating must come to the same place and your installation is little better than a pipeless job.

By using two cold air registers, you can divide the flow of cold air and you will not notice any draft to speak of. By placing the cold air registers where shown on the sketch you will eliminate very near all the cold air draft from your floors.

Place your warm air heater so as to get your pipes as near the same length as possible. This is what gives results. Get your piping large enough to insure a free and rapid circulation and you will have a good heating job.

I place my warm air registers close to doors where it is convenient so as not to spoil the rooms for setting furniture. This is the plan I always follow and I always have had success with it. I have the first job to change or give trouble.

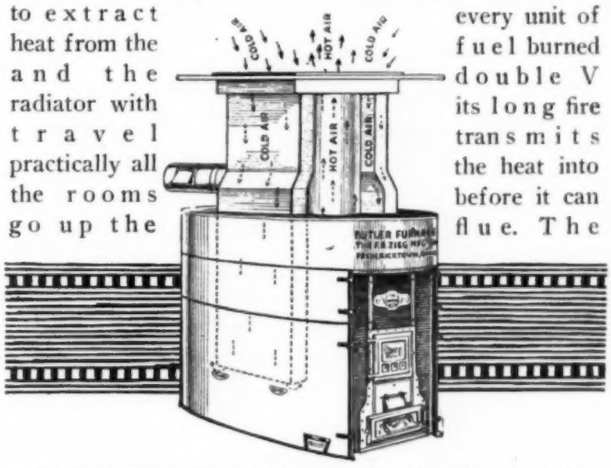
Yours truly,

J. P. Nelsen.

Ringsted, Iowa, June 7, 1919.

HAS AN IMPROVED HEATING UNIT.

One of the strong points of the Butler Pipeless Warm Air Heater, which is shown herewith, is the improved heating unit. The unusual fire box is said to extract every unit of heat from the fuel burned and the double V radiator with its long fire travel transmits practically all the heat into the rooms before it can go up the flue. The



Butler Pipeless Warm Air Heater, Made by The F. B. Zieg Manufacturing Company, Fredericktown, Ohio.

Butler heater burns coal, slack, or wood economically and is said to give remarkably good results with wood as the shape of the fire box permits the wood to lie down in the best position for burning, instead of standing on an end.

The heater is very easily installed as the heating unit is completely assembled when received. All that is necessary is to set it in position directly on the floor, there being no pit to dig and no joints to caulk or cement. Then the oval wrought iron base is put around the heater, the lower strip put in position, and the draw bolts tightened. After this the T iron is placed in position and the installer can proceed with the assembling.

The Butler heater is provided with a cap which can be removed in extreme weather to keep the basement contents from freezing. The smoke pipe can be run up to any height, wherever convenient, directly through the casing or in any direction desired. A special slide door is provided in the rear of the heater to permit the removal of anything that may have accidentally been dropped into the register. Further particulars and interesting literature may be obtained by addressing The F. B. Zieg Manufacturing Company, Fredericktown, Ohio.

National Warm Air Heating and Ventilating Association Has Instructive Convention.

In one of his essays, Montaigne declares that "without doubt it is a delightful harmony when doing and saying go together." No more happy illustration of this concordance between promise and performance can readily be found than in the work of the National Warm Air Heating and Ventilating Association whose sixth annual convention was held June 11, 1919, in Hotel Deshler, Columbus, Ohio. The promise is contained in the statement of the objects and aims of the organization to advise the public of the advantages of warm air heating; to improve conditions in the industry and protect its common interests; to provide

Wilbert G. Wise, Re-elected President
National Warm Air Heating and Ventilating Association.

reliable engineering data; to formulate desirable building codes and promote correct installation; to impress upon dealers and the public the value of proper pipe, registers, and other accessories; to interest architects and secure their endorsement; and to induce educational institutions to include courses in warm air heating.

The performance is amply attested by results both for the benefit of the industry and the people at large. The establishment of the Warm Air Heater Research Laboratory at the University of Illinois, the opening of courses in warm air heating at the leading institutes of technology, and the founding of the Research Bureau of the American Society of Heating and Ventilating Engineers at the United States Bureau of Mines Laboratory in Pittsburgh, Pennsylvania, are achievements in which the National Warm Air Heating and Ventilating Association has taken a prominent part.

Moreover, the policy of the Association has consistently emphasized the obligations of the industry to the people and has fostered improvements in the service rendered to the consumer. The officers and members of the organization recognize that the success of their business is dependent upon the comfort, happiness, and contentment of the householders who use their products. By giving satisfaction, they gain the good will of their follow men and this redounds to the advancement of the industry. So thoroughly is this truth perceived that it was uppermost in all the deliberations of the convention, which was called to order promptly at 10 o'clock Wednesday morning, June 11, 1919, in Hotel Deshler, Columbus, Ohio.

After roll call and reading of the minutes and communications, the president of the Association, Wilbert G. Wise, delivered his annual address to the assembly. In clear and simple phrases he reaffirmed the need of cooperation among the members and of genuine service to the public. His speech deserves attentive reading. Its text in full is as follows:

Address of President Wilbert G. Wise to the Sixth Annual Convention of the National Warm Air Heating and Ventilating Association in Hotel Deshler, Columbus, Ohio, June 11, 1919.

"A year has passed since our last meeting in Milwaukee, a year seemingly short period of time, but perhaps covering a succession of events, the most momentous, the most critical in all history.

"In the first half of this period were the fiercest, though happily the final battles of the great World War, and the signing of the armistice, which brought an end to hostilities. The last half covers a period of waiting and a partial adjustment of our business conditions, and now six months after the signing of the armistice, if we take an inventory of the problems of readjustment confronting the world, we must recognize that we are still standing on the threshold of the period of readjustment, awaiting the final settlement, which alone can open the way to the resumption of normal conditions.

"As to our industry and the part it played in affairs during these troublesome times, we have suffered little and perhaps profited much. We have suffered rather a serious interruption of our business by curtailment of volume of business; by bad working conditions; by adverse government regulations. These, however, were somewhat offset by government requirements, which some of our plants were in position to take advantage of, and render assistance to the Government and at the same time keep their plants fairly well occupied.

A New Order of Things.

"That we have profited by these unfortunate conditions lies in the fact that a new order of things seems to have taken place. Business in the future will be transacted on a firmer and more equitable basis. The average man has taken a different view of life, he is

thinking differently, acting differently, and has resolved to live differently. He is beginning to enjoy the contentment of home ownership, and is not satisfied with merely a house to live in, but a home, equipped with conveniences and comforts that will bring happiness and contentment, and establish a standard of living that will of necessity bring about a great increase in the use and installation of heating plants, without which no home is now complete.

Extensive Housing Operations Are Under Way.

"Large industrial concerns are carrying on housing operations on an extensive scale for the benefit of their employees in recognition of the fact that good home conditions make good workmen. Reports of housing conditions throughout the United States show that thousands and hundreds of thousands of houses are needed, practically every section of the country being short of housing facilities. This then insures a big warm air heater business for the future.

"The heating pendulum has been swinging in favor of warm air heaters, which today is recognized as the most practical of house heating. That warm air heating has been gradually gaining on steam or hot water or any other method, is quite noticeable, which will further increase the demand for our product.

"The warm air heater industry is a very large one, comprising a large number of plants, involving millions of investment, and can be classified as one of the few large industries absolutely necessary to health, comfort and happiness.

"Is it not fitting then, gentlemen, that we should be organized and assemble here as we are today to exchange views and ideas and devise plans for the betterment of the industry, and consequently for the benefit and greater satisfaction of that great mass of people who demand from us the best we can produce in goods and in service.

Association Is in Satisfactory Condition.

"Our Association, as will no doubt be shown by the reports of our Secretary and Treasurer, is in a very satisfactory condition, and great credit is due our Secretary and our Treasurer and our various Committees, all of whom have been untiring in their efforts satisfactorily to administer the affairs of this Association.

"Our activities might not have been carried on on the scale that we might wish, but perhaps were all that the unusual conditions warranted. Our chief activity during the past year is in our Research Bureau, which has been most admirably handled by a special committee, appointed for that purpose. It is not necessary for me to comment upon what has been done in that particular, as we have with us today several capable gentlemen who will present that subject to your great satisfaction.

"Other matters of interest will also be presented to you by the various committees having them in charge.

Closer Cooperation Is Essential.

"If I were asked to criticize the workings of our Association, the only possible weakness I could mention would perhaps be a lack of proper cooperation with, and confidence in, one another.

"It is an elegant thing, gentlemen, to have confidence in one another, and when you show confidence in the other fellow he will soon see that it is up to him to have confidence in you.

"Cooperation and confidence is the keynote of our success, and should be fostered and when we once attain this in the proper degree other matters will naturally take care of themselves.

"Perhaps more frequent meetings would bring about a closer relationship, and I would recommend that our Executive Committee work out a program of activities and procedure for the coming year that will be instructive, progressive and interesting to our membership, and in this particular let me impress upon every member of our Association that it is his duty to assist the officers and the Executive Committee in every possible way.

"The inclination in all such Associations as ours is to let someone else do it. That is not the right spirit. We should, and must, every one of us, be free at all times to voice our views and be ready to lend every possible assistance, and any thought that any member may have for the good of the warm air heater industry should be brought before the Association for consideration.

Much Remains to Be Done by Association.

"The warm air heater industry has always been handicapped by many evils, some of which have been removed by the work of this Association, but there is still much to be done to correct the evils still existing. With the costs of production the highest in history, with labor restless, constantly making demands, with penalties put on industry by the Government, it behooves us, gentlemen, to put our house in order that we may successfully meet any conditions that may arise and keep our industry on the high plane where it belongs.

"I wish that I could bring to you today a message that would be of benefit to each of you. My lack of ability to do this will no doubt be offset by the many good things that will be covered by our program and handled by persons of known ability.

"In closing, then, permit me to again emphasize the necessity of cooperation with one another, confidence in one another and infinite good will towards one another, establishing a mutuality that will give credence and strength to our Association."

The report of the Treasurer, I. L. Jones, showed the finances of the Association to be in a flourishing condition. Full value has been received for every dollar expended. The funds of the organization have been handled with a wisdom and judgment which merit unqualified approval.

Secretary Allen W. William's Report, Meeting National Warm Air Heating and Ventilating Association, Hotel Deshler, Columbus, Ohio, Wednesday, June 11, 1919.

"After consulting with our Executive Committee and reflecting to them the different opinions of various members as to the advisability of gathering even the limited information as we have done in the past, it was decided best to make only one inquiry this year from the manufacturers, which inquiry was as follows:

" 'What was the percentage of increase or decrease in the number of warm air heaters you manufactured during 1918 as compared with 1917?"

"Desirable as reliable data might be, unless it is

accurate and practically all of the manufacturers furnish same, it is not only useless but is apt to be misleading and do more harm than good. Other industries have experienced much difficulty in collecting figures of this kind and some at least have discontinued the practice.

In answer to the statistical question asked, the replies received are as follows:

21 houses report increase averaging 15 per cent.
70 houses report decrease averaging 23 per cent.
8 houses report no change.

"It may be estimated that the decrease in units amounted in round figures to 35,000. There is no question but what the Government's use of room heaters and the advent of the pipeless is responsible for as good a showing as this during a war time year. Otherwise, with the falling off in building the story would have been very different.

"Again this year I would respectfully suggest that if it is the wish to continue or extend the compilation

Allen W. Williams, Re-elected Secretary
National Warm Air Heating and Ventilating Association.

of any statistics, that a committee be appointed to formulate the questions to be asked and have general supervision of this work.

Collection Department.

"Number of accounts received for collection to date, 655.

Amount of same, $61,299.28.

Amount collected during the year, $7,246.19.

Total amount collected to date, $38,525.08.

"There is nothing obligatory as to the use of this Department by the members, but I believe in more instances it could serve you economically and to your advantage.

Costs.

"For the second year our costs have increased until they are upon the highest plane in the history of our industry, and bid fair to remain there for sometime to come. If there has been any actual reduction in the cost of materials it has been repeatedly stated by some of the best authorities that this is more than offset by an increase in the price of labor and the amount of overhead and selling expenses. In spite of this condition there has been some reductions in the selling prices, but in view of the falling off in the demand for our goods this year, profits have evidently not justified general reductions.

"When the United States Department of Commerce made the effort to start business by reducing market prices of materials, I am sure our members were anxious to do their part, but like other industries, the benefit which might have been brought was lost through the confusion in governmental authorities which followed.

War Service.

"Again this year the subject will be fully covered by the report of our War Service Committee, but it seems proper for me to say that since the signing of the Armistice many matters of interest and real value to our industry have come to my office, and an honest effort has been made to keep the members in touch with same and to see that all were represented and protected in proposed actions. Mr. Edward Norris, as Chairman of our excellent War Service Committee, has kept us fully informed as to anything pertaining to this work and I believe every manufacturer in the industry must realize that they were under many obligations to him for his untiring interest during the past year, as well as to the entire committee. The answers to numerous questionnaires required were certainly furnished promptly and this was a great help.

Advertising Department.

"With no publicity campaign it has been rather surprising to find that quite a number of dealers have used the advertising copy furnished some two years ago, and consumers' inquiries still reach my office. At the direction of the Officers electros which had outlived their usefulness were sold. We still have on hand signs, booklets and other advertising supplies representing a value of approximately $300.00. I have sent out quite a number of the booklets during the past year.

Trade Mark.

"The number of members using our trade mark is increasing, but the value of same can be made quite an asset if every member will use it. The Association is ready and willing to furnish cuts of same free in sizes of half inch and larger.

The One Price Plan.

"As you are well aware, the idea of this plan is to have one set of prices varying only as to quantity purchased. Such a practice is strictly in accord with the rulings of the Federal Trade Commission and would undoubtedly make for a better market. No suggestion of price agreement is intended. This matter is commended for the serious consideration of every warm air heater manufacturer.

Prospects for Our Goods.

"The United States Department of Labor has certainly been making an earnest and persistent effort to start building and it is surprising that our sales have been as large as they have when it is considered that even in a city like this, Columbus, where the normal yearly average is 2,000, not over 200 dwellings were erected during 1918. It is stated that in Chicago 10,000 homes are needed per year. (American Geographical Magazine.) The United States Labor Department's

printed matter states that in practically every section of the United States there is a shortage of homes. The following is quoted from their recent pamphlet 'Build It Now.'

'In normal times, under normal conditions, it required the the building of about 600,000 homes per year to supply the normal growth of the country and replace the losses caused by fire and other destructive agencies. For the past two years, owing to causes growing out of the world war, this normal construction of homes has been practically suspended. What housing construction has been accomplished has been for the major part that which was demanded to meet war conditions. Shortage of labor and restrictions on the use of building material stopped the work.

'At this time there is a shortage of homes in America of nearly a million, to which must be added the normal requirements of the year just opening. Most of the present shortage has not been wholly abandoned, but has been merely postponed and delayed, and the pressure to inaugurate and complete this delayed construction will shortly be felt—as soon as weather and climatic conditions make such work feasible.

"It does not require much stretching of the imagination to see what the demand for furnaces and their accessories can be created and will be when once the building of homes is actually started, nor that it is unsafe to feel that it will continue for several years.

"It would seem that even an ordinary optimist can safely predict unusual opportunities in store for our industry the coming year. Unquestionably the volume of sales will be large. The danger apparently lies in overlooking the increase in overhead and selling expenses and finding sooner or later that they have consumed even our legitimate profits.

"Changes and additions can be expected in our lines of goods and the manufacturer must be prepared for them.

Pipeless Heater.

"You are well aware that the sale of this type has increased heavily during the past year. It has undoubtedly come to stay in its proper field. When home building is normally resumed, I believe the sale of pipe jobs will also be larger than ever. In other words, that the demand for both styles will increase.

Foreign Prospects.

"Previous to the war there seemed to be little opportunity of success in seeking business abroad. Numerous other lines who in the past have had no export trade are reported as now selling goods abroad. It may be that at least some styles of our goods can be successfully sold in Europe, and since several banking houses, as well as the Government, maintain a department for promoting export trade and will furnish all necessary information without charge, it would be wise for us to have a special committee whose duty it shall be to investigate and report.

Our Research Activity.

"The report of our special committee covers in detail what has been done and the possibilities it contains. In a general way, however, may I say that the interest in our effort to collect engineering data has attracted wider attention than you may suppose, and the interest of the members has been remarkable, considering the patience required to get this work under way during war times.

"Professor Willard, in his letters to me, has frequently mentioned the visits they have had from our members and states that in every case he has felt that the men who have taken the time and trouble to come down have been impressed with the work and stand ready to support its continuance. I have endeavored to keep the members informed as to what was being done. The first report in printed form was mailed to the membership May 28th being University of Illinois Bulletin No. 112. It is extremely interesting and recites the early objects of the investigation as follows:

(1) To determine the efficiency and capacity of commercial warm air heaters under conditions similar to those existing in actual installations with leaders, stacks and registers to form a complete system.

(2) To determine satisfactory and simple methods for rating warm air heaters so that the proper size and type of warm air heater can be definitely selected for the service required.

(3) To determine methods of increasing the efficiency and capacity of warm air heating equipment and the advantages or desirability of certain types of design.

(4) To determine the heat losses in warm air heating systems and the value of insulating materials as affecting the economy of the warm air heater or the leaders and stacks, and finally of the system as a whole.

(5) To determine the proper sizes and proportions of leaders, stacks and registers supplying air to first, second and third floors.

(6) To determine the friction losses in the cold air or recircuiting ducts and registers and their proper size, proportions and arrangement or location.

(7) Eventually, to make a study and comparison of outside and inside air circulation as affecting the economy and operation of warm air heater systems.

Trade Press.

"It is a pleasure again to remind you how generous they have been to the activities of our Association, and it is entirely our fault if we do not take advantage of same.

Legislation.

"During the past winter freak legislation has developed in certain states and this has required more attention than heretofore. It will evidently grow and we must be prepared for special activity during our new year in connection with same. The new Michigan law, Senate Bill No. 146, is unsatisfactory to many, but much worse legislation in that state was prevented.

Freight Matters.

"The most important item in this connection has been the publication of the proposed Consolidated Freight Classification No. 1. I have attended all of the hearings bearing on our goods and we are under obligations to many of the members and their Traffic Managers for their assistance in this connection. Generally speaking, this classification affects our goods comparatively little and a mixed carload is provided which affords opportunity to load with warm air heaters anything that would reasonably be shipped with them. Some changes have been requested but the result remains to be seen.

Closing Accounts with Trade Acceptances.

"During the past year the securing of trade acceptances has been urged, not only as a means of expanding available funds but to the end that prompter payments of accounts may be secured and ninth-hour complaints often advanced by debtor as a play for addi-

tional time may be eliminated. Almost without exception houses that close their accounts receivable by trade acceptance are highly pleased with the result. The close of the war is apparently no reason to discontinue this policy.

Standardization.

"The United States Bureau of Standards is assisting in the formulation of a series of "National Industrial Safety Codes." One of their representatives called recently and advised that the bureau had been requested "to promote comprehensive and authoritative machinery for the development of Engineering and Industrial Standards by the operation of which duplication would be avoided and coöperation between all interested organizations and government departments secured, so that when a standard or group of standards is developed it will be acceptable to all concerned and therefore a real American standard."

"This is called to your attention as the results bid fair finally to extend more or less to every industry both as to materials purchased and goods made. How far Standardization might be carried in our product without the loss of individuality is a question, but is something I am told we may be called upon to consider in the near future.

In General.

"During the past year war conditions have naturally influenced some of our activities, and our efforts have necessarily been directed in unusual but nevertheless important directions. It would seem that from now on we may reasonably expect to operate the Association along normal lines and extend them to the value of the industry.

"The National Association of Purchasing Agents is urging the standardization of invoice sizes as a convenience in filing, economy of stock, etc. During the year it is quite probable they will agree on a standard size.

"It is a satisfaction to say the members have evidently felt free to use my office in connection with any matter directly or indirectly connected with their business. The more of a clearing house it can be made the better.

"It would seem that even an ordinary optimist can safely predict unusual opportunities in store for our industry the coming year. Unquestionably the volume of sales will be large. The danger apparently lies in overlooking the increase in overhead and selling expenses and finding sooner or later that they have consumed even our legitimate profits.

"President Wise has constantly directed and supervised the work of the Association through my office and is entitled to our gratitude. The same is true of our Treasurer, I. L. Jones and our Executive Committee.

"May I also express my own sincere thanks for the indulgence and help of every member during the past trying year."

After the report of the Secretary, Allen W. Williams, auditing, nominating, and memorial committees were appointed by the president. Then came the reports of the auditing and executive committees, the war service committee, and the committee on Warm Air Heating Research at University of Illinois.

Illuminating comments were made upon the report of the Committee of Warm Air Heating Research at the University of Illinois by Professor Willard and P. J. Daugherty and then Messrs. Jay and Kratz of the Research staff and by C. G. Whalen.

The personnel of the committees appointed by President Wilbert G. Wise is as follows:

Auditing Committee:
Ed Norris,
R. C. Cook.

Nominating Committee:
John D. Green,
W. P. Cook,
Philip Will,
Charles Seelbach.

Memorial Committee:
I. L. Jones,
Frederick K. Will,
Ed Norris,
D. Rait Richardson.

The first two members of the Memorial Committee were designated to draw up appropriate resolutions of regret at the death of Henry T. Richardson who departed this life November 17, 1918.

The last two members of the Memorial Committee were entrusted with the duty of expressing the Association's sentiments of sorrow at the demise of W. L. Dawborn who died November 30, 1918.

An unusually clever and instructive lecture was delivered by Professor John R. Allen, Dean of College of Engineering and Architecture, University of Minnesota. Professor Allen has done much to enrich the science of warm air heating and has been chosen to head the Research Bureau of the American Society of Heating and Ventilating Engineers at Pittsburgh, Pennsylvania. His lecture dealt with the highly important subject of "The Design of Warm Air Heaters." The complete wording of the address is herewith reproduced:

Address on Design of the Warm Air Heater by Professor John R. Allen, Dean of College of Engineering and Architecture, University of Minnesota, Delivered Before Convention of National Warm Air Heating and Ventilating Association, June 11, 1919, at Hotel Deshler, Columbus, Ohio.

"The warm air heater is one of the oldest forms of central heating that has been used in this country, and today it has a definite place in the art of heating. It is recognized as one of the very best forms of heating for small and medium sized houses and buildings. Its development, however, has been retarded by the manufacturers and the mechanics that have been installing the apparatus. This has been due to the lack of fundamental knowledge of the proper design of warm air heaters and their proper installation. In many large plants the warm air heaters have been designed by the pattern maker and not by men familiar with the installation and operation of such heaters. Many imperfections of design and much of the inconvenience in warm air heaters could have been eliminated if more care had been exercised in the application of fundamental principles to warm air heater design. Recently some experiments have been con-

ducted of a valuable character on the warm air heater and much valuable information may be expected from the experimental work now being carried out at the University of Illinois. Few consulting engineers recommend the use of the warm air heater because there is not enough experimental data available for them to check up the design of the system submitted. If the warm air heater business is to develop as it should, warm air heater manufacturers must give out all the data possible to the engineers so that they can intelligently design warm air heater plants or check the design of these plants.

"In this talk I wish to make some suggestions in regard to the satisfactory design of a warm air heater and try to point out where more exact data is necessary.

Warm Air Heater Design.

"There is no reason why a warm air heater can not be calculated with as much accuracy as a steam boiler in a steam heating plant, if we only have the necessary constants to place in the expressions. These constants, however, must be determined by practical demonstrations carried on in the laboratory. The trouble now is that the so-called practical man designs these warm air heaters by theoretical guessing and what the warm air heater man should have is actual results determined by practical demonstrations in the laboratory.

"In the design of any device for the extraction of heat it is a fundamental fact that for the best efficiency the hottest gases to be heated must come in contact with the coldest surfaces. This means, in a warm air heater, that, for the best efficiency, the hottest gases leaving the fire should transmit their heat to the hottest air leaving the heater, and the coldest gases leaving the fire should come in contact with the coldest air entering the heater. Only by observing these fundamental principles can the greatest efficiency in the warm air heater be obtained.

"In the discussion to follow it is assumed that the air in the warm air heater is recirculated under conditions of full load. The reason for assuming this condition is that in most houses outside air is not necessary. I do not believe that it is necessary to argue this point as this is the condition that exists in all houses heated by steam and hot water and we have little if any complaint on account of lack of ventilation. As far as ventilation is concerned a warm air heater usually recirculates all the air in the house while the steam and hot water plants recirculate the air in each room. We all know that in the average house the infiltration of air through the walls and windows will change the air once per hour which is more than enough for ventilation in the ordinary residence occupied by four or five people.

Begin Designing With the Grates.

"In designing a warm air heater the logical place to begin is the grates. The depth of fire on the grate will depend on the kind of coal and the strength of the draft. Let us assume a good average draft and anthracite coal. The size of the grate necessary to furnish a certain amount of heat will depend on how often the warm air heater is fired, in other words the firing period. It is customary to assume in rating steam and hot water boilers an eight hour firing period and I believe the same assumption should be applied to the warm air heater. One square foot of grate will hold about fifty pounds of anthracite coal. About forty pounds of this can be burned leaving ten pounds on the grate to kindle the new fire. If we burn this forty pounds of coal then in eight hours we will burn five pounds of coal per hour per square foot of grate. If the coal contains 12,500 British Thermal Units and the efficiency of the warm air heater is 60 per cent, then there will be available 375,000 British Thermal Units per each square foot of grate per hour. It has been customary to assume that a certain size of grate will heat a certain volume of house. This rule, however, is only an approximation and a very rough one. The amount of heat necessary depends on the wall and window surface, the construction of the house, upon the outside and inside temperature and not upon the volume of the house. More depends upon the window surface and construction than on any other factor. It would be very much better to rate a warm air heater as giving off a certain number of British Thermal Units than as heating a certain volume of house, as the rating of the warm air heater by volume is very misleading. The reason why this has not been done is because the average man installing warm air heaters does not know what is meant by British Thermal Unit. In fact he thinks it is some form of germ or bug that is unknown and dangerous. You should educate the trade to a better understanding of the fundamental principles of heating. This is being done by the steam and hot water manufacturers with a corresponding improvement in their business. Now is a good time to begin a campaign of education when the public is in a receptive state of mind.

Determination of Heating Surfaces.

"A warm air heater may contain sufficient grate surface to heat the house but if it does not have a proper amount of heating surface to take the heat away from the hot gases leaving the fire then this heat instead of going into the house will be wasted up the chimney. In considering heating surface we must distinguish between two kinds: fire surface and flue surface. Fire surfaces are those surfaces that see the fire on one side and have cold air to be heated on the other side. Flue surfaces are those surfaces which have hot gases on one side and cold air to be heated on the other side but do not see the fire. In the flue surfaces all the heat is removed by contact of air or convection and in the fire surfaces the heat is removed by radiation as well as by convection. That is, in the fire surfaces part of the heat is transmitted from the fire directly to the heating surface by radiation just as light is given off from an electric light and the remainder of the heat is given to this surface by the air passing over the surface or convection.

"An important question in warm air heater design is the determination of the proportion of heating surface in a warm air heater that should be flue surface and the proportion that should be fire surface. You can better understand this by considering different conditions of operation. First let us consider the condition of maximum operation when the drafts in the chimney and in the grate are open and maximum combustion is taking place in the warm air heater. Be-

tween twenty and twenty-four pounds of air are passing through the warm air heater per pound of coal burned and this air is passing through the warm air heater with a high rate of velocity to the stack. Under these conditions all the heat which is not removed by the fire surfaces must be removed by the flue surfaces, and there must be sufficient flue surfaces to prevent the gases from leaving the warm air heater at too high a temperature. In a good warm air heater the gases leave the fire box at from seven to nine hundred degrees and if we assume the stack temperature at three hundred there will be required from 9½ to 11 square feet of flue surface per square foot of grate surface in order to get good economy at full load. In other words from forty to fifty per cent of the effective heat of the coal is taken out in the flues under full load conditions. If the flue surfaces are reduced much below this figure under full load conditions, there will be a material loss to the stack. As warm air heaters are operated only at full load for short periods of time, it is probably wise to sacrifice a little on the flue surfaces and in many cases eight square feet of flue surface per square foot of grate surface would be sufficient.

Regulation of the Drafts.

"On the other hand when the warm air heater drafts are all closed only a very small amount of air passes through the fire and through the flues. Under these conditions most of the work is being done by the fire surfaces. The amount of coal burned is small and the amount of heat received by the fire surfaces is received by radiant heat from the fuel bed and is largely obtained by reducing the temperature in the fire bed. When the drafts are wide open the fuel bed may have a temperature as high as twenty-five hundred degrees and after the drafts are closed it will slowly cool down to as low as 1,200. If it is cooled below this point it is difficult to start a new fire. The heat given off by this cooling is transferred to the heating surfaces that see the fire by radiation. In considering the fire surface it will then be necessary to consider both the heat received by convection and the heat received by radiation, so that these surfaces are more effective than the flue surfaces. At light load a warm air heater having large fire surface and small flue surface would be as economical as if the flue surfaces were largely increased. But at full load such a warm air heater would be very uneconomical.

"In the following table I have suggested some of the proportions giving the maximum and minimum figures that would seem desirable. The problem of warm air heater design for full load.

"All quantities are based on one square foot of grate surface.

	Maximum	Minimum
British Thermal Units per square foot of grate per hour (total 8 hour firing period)	62,500	62,500
British Thermal Units available in the heated air per square foot of grate per hour	37,500	37,500
British Thermal Units taken out by the flue surface	12,000	9,000
British Thermal Units taken out by the fire surface	25,500	28,500
British Thermal Units radiated by the fire	15,000	12,000
British Thermal Units removed by convection in fire surface	10,500	16,500
Heat transmitted per square foot flue surface per hour (K-2.5)	1,075	950
Ratio grate to flue surface	9	17.5
Heat transmitted per square foot of fire surface per hour	2,750	2,500
Ratio grate to fire surface	4	6.5
Ratio of heating surface to grate surface	13	24
Percentage of fire surface	.30	.30
Percentage of flue surface	.70	.70

This table, however, is for full load. It has been computed from the best experimental data available and yet it is undoubtedly far from accurate as there is very little accurate data available from which to make a computation of this kind. It has always been a question, however, in my mind whether we should design warm air heaters for full load or for half load. These plants under average conditions operate at half load and to my mind the half load economy is much more important than the full load economy.

I have therefore compiled a table giving these ratios for half load conditions

Half Load Proportions.

	Minimum.	Maximum.
Ratio grate to flue surface	3.5	6
Ratio grate to fire surface	5.5	6
Ratio grate to heating surface	9	12
Per cent fire surface	60	50
Per cent flue surface	40	50

You will notice that the proportions are perceptibly changed, and the desired amount of fire surface very much increased.

"If I had the data available and the time I would like nothing better than to compare the present makes of warm air heaters and see how they check up against these calculations. I know, however, that the table given for half load conditions comes pretty close to the practice of one of the largest warm air heater companies.

Air Space In Casing.

"One very important consideration in the design of the warm air heater is the air space between the warm air heater and the casing. I know of no data available for determining what this air space should be. We do know, however, the limitations. The velocity of the air through the warm air heater is produced by the difference in weight between the column of hot air inside the warm air heater and the corresponding volume of cold air outside the warm air heater. Assuming that this column of air is from the first floor to the center of the fire box section we have available an available column of air for producing velocity of about three-fourths of a foot. This gives a theoretical velocity of not much over 400 feet per minute and actually, when you take out the warm air heater resistance and the piping resistance, probably less than 300 feet per minute, so that under normal conditions the velocity of air through the warm air heater should not exceed 300 feet per minute. This then will determine the area between the warm air heater and the casing in order to pass a certain amount of air. In many warm air heaters, however, this area is very badly proportioned. If a radiator is properly enclosed in the back to introduce a high resistance at the back of the warm air heater and a small resistance at the front of the warm air heater, the result of this arrangement is that a large amount of cold air slips up through the warm air heater owing to the low resistance at the front and only a small amount of cold air can pass up

around the radiator due to the increased resistance. It is surprising with air how cold and warm layers will exist even with considerable length of pipe and this arrangement sometimes results in much colder air going to some pipes in the surface than to others, tending to exaggerate the conditions of unequal heating.

Importance of Correct Radiator Design.

"It is very desirable that the radiator in the warm air heater be so designed that the resistance to the passage of air through all points of the warm air heater shall be the same. It is also desirable that the warm air heater be so designed as to mix thoroughly the currents of air preventing warm and cold streaks. Most warm air heaters place the radiator in the top of the heater. This is where the air has the greatest volume and in this position offers the greatest resistance increasing warm air heater resistance. If possible the warm air heater radiator should be placed where the air is coldest as at that point the air has the lowest volume and radiation will produce the least resistance.

"Assuming each square foot of grate gives up 37,500 British Thermal Units and that the temperature of the air entering is 60 degrees and of the air leaving 140 degrees, then each square foot of grate will warm 37,500 divided by $80 \times .24 \times .0674 = 29{,}000$ cubic feet of air per hour, or approximately 480 cubic feet of air per minute. Allowing a velocity of 300 feet per minute in the casing as the maximum possible, then each square foot of grate should have 1.6 square foot of air area in the casing. In many cases it would not be advisable to allow more than 240 feet of velocity per minute and in this case there should be at least two square feet of air area for each square foot of grate.

"Experiments on heat transmitted by convection which is the method of heat transfer in the warm air heater casing, show that the greater the resistance to the passage of air the more is the heat given out per square foot of heat surface. In a warm air heater it is not possible to increase the resistance very appreciably owing to the fact that the force available to produce circulation is extremely small. It is desirable, however, that the manufacturer introduce as much resistance in the air passage of the warm air heater as conditions of operation will permit, as the more resistance introduced by the heating surface the more effective this surface becomes. To put it another way, the air passing through the warm air heater should be brought as close in contact with the hot surfaces as possible. The governing velocity in the warm air heater casing is determined by the first floor rooms and enough resistance must be introduced in the pipes leading to the second floor rooms so that the velocity produced in the warm air heater casing by the first floor rooms and by the second floor rooms is the same. Too little resistance in a warm air heater allows the air to slip through very quickly and has some disadvantages, one of which is that the air will then pass through the warm air heater without being heated uniformity. The result of low velocity is that we have a large volume of air heated to low temperature and a tendency to have hot and cold streaks in the air leaving the warm air heater.

"In this talk I have only had the opportunity of pointing out a few of the problems in warm air heater design. The computations made are only approximate as many of the constants used require verification by actual trial in the laboratory. There are other problems to be solved in connection with the warm air heater and these problems are important to the entire community, as today there are more houses heated by warm air heaters than by any other form of central heating apparatus.

The Vital Question of Humidity.

"The humidity is one of the very vital questions to the warm air heater man, particularly in the colder climates. The colder the climate the more serious the problem of humidity becomes. The placing of a small pan in the cold end of a warm air heater for the purpose of introducing humidity is usually a waste of good material. The ordinary house of eight rooms requires about eight gallons of water per day for humidification. The ordinary warm air heater water pan does not contain over two gallons of water so that it would have to be filled four times a day. Such a device so far as humidification is concerned is only a joke. Any form of humidifying device for a warm air heater must have the water supplied automatically, and must be so constructed as to have the humidity supplied in proportion to the load on the warm air heater. Too much humidity is as bad as too little, and during the winter months in extreme cold weather humidity between forty and fifty per cent is as high as it is ordinarily desirable to carry.

"With proper humidifying device and well installed the warm air heater plant furnishes one of the most desirable means of heating the small or medium sized home."

Following Professor Allen's lecture were two interesting addresses, one by the Honorable A. T. Fleming, Ohio State Fire Marshal on "Avoiding Installation Hazards," and the other by W. E. Pratt, Research Associate, on "The Comparative Cost of Warm Air and Hot Water Plant for Eight Room House."

A general discussion of the question, "The Commercial Side of Our Business, How Can the Association Improve It?" brought out many helpful suggestions and ideas.

The Committee on Nominations decided on the same officers and the same Executive Committee. Accordingly, they were reelected as follows:

President: WILBERT G. WISE,
Vice-president: JOHN A. HOWARD,
Treasurer: I. L. JONES,
Secretary: ALLEN W. WILLIAMS.
Executive Committee: JOHN D. GREEN, chairman, E. P. MILLER, G. D. WILKINION, and R. C. COOK.

In the evening at 6 o'clock a reconstruction dinner and lighter vein characterized the gathering.

Program of Special High Power Reconstruction Dinner of National Warm Air Heating and Ventilating Association at Deshler Hotel, Columbus, Ohio, June 11, 1919.

Music ..... Orchestra
Col. John D. Green—Disguised as a Furnace Mfg. Toastmaster
Song .....Miss Marie De Lancy, New York City
Greetings .....Hon. Geo. J. Karb, Mayor
Music ..... Orchestra
"In Washington During the War" ...Mr. D. Rait Richardson

Music ..... Orchestra
"The Ethics of Our Industry".....Mr. F. T. Giblin
Assignment of Special Toasts .....Toastmaster
NOTE—It is the Toastmaster's privilege to fine any who fail to respond, as well as those who do.

1. Pipe Dreams.
2. Keeping the Heater from Freezing.
3. Are Warm Air Heaters More Ornamental Than Useful?
4. Why Is Ohio Like a Water Pan?
5. All I Know About Warm Air Heating—2 minutes.
6. Heating by Arrows.
7. "Great" Bars.
8. How to Prevent Dealers Overbuying.

Song—"When I Found the Way to Your Heart".....
Written and sung by W. T. Strangward, the Boy Soubrette
"The Way Ahead" ....Mr. Edwin A. Scott
Song .....Miss Jean Marrelo, Paris
Distribution of Special Bulletin.
Impromptu.
"Till We Meet Again"..... Orchestra
Good Night and Good Luck.

MENU.

In Memoriam, J. Barleycorn. Ohio's New Drinks.
Canape of Beluga Caviar.
Little Neck Clams.
Celery.
Martini Cocktail.
Clear Green Turtle, en Tasse.
Cold Water.
Broiled Filet of Whitefish, Sauce Fleurette.
Cucumbers, Sour Cream Dressing.
Potatoes Laurette.
Amontillado. Hot Water.
Olives. Salted Nuts.
Radishes.
Virginia Ham.
Breast of Young Guinea Chicken.
Candied Sweet Potatoes.
Soft Water.
Hearts of Lettuce, French Dressing.
G. M. Mumm's Champagne.
Nesselrode Pudding, Sauce Marasquin.
Assorted Cakes.
Warm Water.
Roquefort and Camembert Cheese, Toasted Crackers.
Rye and Scotch Whiskey.
Dinner Rolls.
Cognac. Hard Water.
Coffee.
Cigarettes. Cigars.

One of the most amusing and delightful speeches of the evening was that made by Thomas W. Pearson of Chicago, Illinois. His whimsical puns upon the names of men and products widely known in the trade were keenly enjoyed by everyone present. He spoke as follows:

A Pun-Alog, or Liberties Taken With Names that May One Day Decorate the Hall of Fame, Being a Whimsical Address Delivered by Thomas W. Pearson at the Banquet of the National Warm Air Heating and Ventilating Association in Hotel Deshler, Columbus, Ohio, June 11, 1919.

"A *Lamb* one day strayed away from the green pastures of his boyhood home filled with the 'wanderlust' and a strong desire to butt into the Commercial game.

"After wandering through forests of *Round Oaks* he saw many *Radiant Homes* looming in the distance. He longed to be in the *Front Rank* and have *Home Comfort*, so, like *Excelsior* he trudged on toward the *Pyramid* of ambition and the *Jewel* of success.

"With *Garlands* of field daisies about his neck, he meandered across fields and ditches toward a large city which he could see in the distance.

"Suddenly he found himself facing a foxy *Fox* trimming the *Wicks* of several large lamps to light the way into a business career. *Lamb* confessed that he was so *Green* from eating village grass that he felt like a dish of spinach, but the *Fox* assured him that *Green* was a great favorite—especially around Detroit, and that if he could master up the pep and energy of a goat instead of a *Lamb*, he could horn or butt his way into the heating game instead of the blasting game.

"*Lamb* took a *Chew* of hillside grass as a farewell souvenir of village life and followed the bright *Wicks* of the lamps to see the paradox of Detroit—the *Green* man who was ripe in years and experience.

"They found him very *Wise*—with a sort of 'down draft' voice, but withal 'radiating" good humor and wisdom.

"Though 'pipeless,' he registered a lot of 'hot air' and 'ventilated' his opinions freely on several warm topics.

" 'Asbestos' he could he explained that it required a good 'dome' and a 'straight front' to make good in the heating game, but he didn't want to cast any 'damper' on the *Lamb's* ambition.

"*Green* sucked up so much ozone from the air inside his palatial office that *Lamb* decided to take 'outside' air for awhile and think it over. The 'cubical contents' of his stomach were very low in 'cross section' and he decided he needed some fresh B. T. U.'s or Bevo to bring his temperature up to normal. *Lamb* gave *Green* a strong wink but, Detroit having been annexed to the Sahara Desert, he only got his 'water coil' filled with river water!

"*Lamb* decided that *Green* was too *Close* and felt *Moran Moore* the need of B. T. U.'s in his carbureter.

"His *Cash* was very low and he had to 'Underfeed' and remain 'Smokeless' so long that his stomach began to feel like a 'Square fire pot' with a vacuum in each of its four corners. He met a *Miller* who wanted him to go to the *Torrid Zone* and grind out *Hot Blasts* but he was afraid he would *'Cook* his goose' unless he *Wasson* the job as a *Boomer* of one line.

"He found a low *Rait* advertised to New York and had visions of winning a *Laurel* and possibly *International* fame by *Superior* efforts and become a *Hero* by getting up a *Patton* on something!

"At the station he met a Kindly traveler who showed him that where there is a *Will* there is an iron foundry and who said, 'Come and go *Oswego!* He found New York a vast *Estate* pulsing with industrial energy and the ground covered with giant manufacturing plants instead of *Acorns* and *Live Oaks.*

"And so the die was cast and he joined this bunch of pirates who believe in 'low down' methods in dark and clammy cellars to achieve upright results.

"*Norris* that all; No *Harms* came of it.

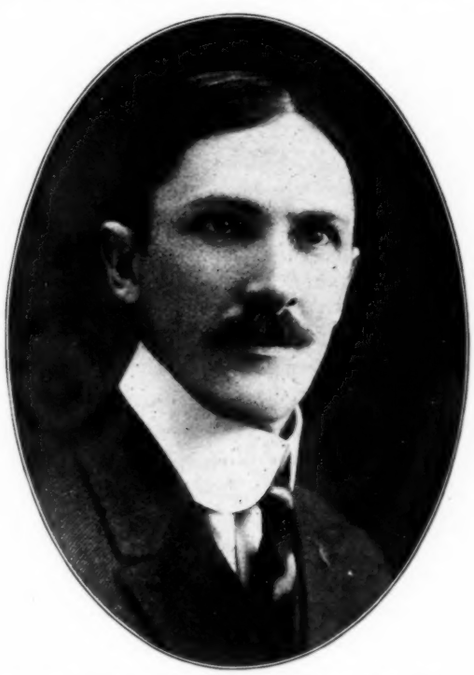
"It is a *Gilt Edge* business, in fact, a strong *Favorite*—when you mix your B. T. U.'s properly with your H. & V. A.'s and once every so often get together as you are tonight and from the *Noll* of success view past records and future aspirations in a flow of soul and feast of good fellowship.

"Verily, *Co-operative* effort is the *Climax* of the *XXth Century!* Amen!"

Another good thing about the man who beats the bass drum is that he doesn't have to strain his voice. Galveston News.

Semiannual Meeting of Heating and Ventilating Engineers Marks Beginning of New Epoch.

The inauguration of a period of greater scientific accuracy was signalized by the semiannual meeting of the American Society of Heating and Ventilating Engineers, June 10 and 11, 1919, in the William Penn Hotel, Pittsburgh, Pennsylvania. It marked the completion of the plans for the establishment of the Society's Research Bureau in connection with the laboratories of the United States Bureau of Mines in Pittsburgh. Heretofore, owing to the lack of systematic tests on a large scale, the data available for determining heat co-efficients has been of an empirical nature.



C. W. Obert, Secretary American Society of Heating and Ventilating Engineers.

A closer approximation to accurate formulæ is possible only through long and careful experimentation. Much has been accomplished in this direction by the Engineering Experiment Station of the University of Illinois. It is believed, however, that greater facilities for carrying on the work will be had in the Society's Research Bureau under intensive specialization.

Tuesday, June 10, 1919.

The opening session, Tuesday morning, June 10, 1919, consisted chiefly of reports of various chapters of the society, including Illinois, Kansas City, Massachusetts, Michigan, Minnesota, New York, Western New York, Ohio, Eastern Pennsylvania, Pittsburgh, and St. Louis. These were followed by the report of the Committee to Coöperate with the United States Navy Department. This committee was originally appointed for the purpose of conferring with and assisting the United States Bureau of Construction and Repair and the United States Bureau of Steam Engineering on the question of heating, ventilation, and humidification of battleships and submarines. An investigation of the circumstances in which the crews of submarines worked revealed the need for better methods of heating and ventilation of the atmosphere within these vessels. It opened up a new field for the services of the heating and ventilating engineer and presented problems whose solution come rightly within the sphere of the profession.

The report of the Committee on Schoolhouse Standards preceded two informative papers relating to the same subject, namely, one on "Classroom Ventilation" by Konrad Meier, and the other by J. D. Cassell on "Heating and Ventilating the Standard Schoolhouse."

Tuesday afternoon a professional session was held at the United States Bureau of Mines laboratories where the Committee on Research delivered its account of what has already been accomplished. Among other things, the Committee reported that the "drive" for solicitation of funds for the financing of the Bureau, which was being prosecuted so vigorously at the time of the annual meeting of the Society in January, has been so successful, and the support given not only by other associated organizations but also by the Government, has been so generous that the success of the undertaking is assured. The Committee announced that it has been able to secure the services of Professor John R. Allen as Director of the Bureau.

Professor Allen, who was a past president of the Society, is well-known for his work in research in heat engineering at both the University of Michigan where he served many years as professor of mechanical engineering, and subsequently at the University of Minnesota where he is Dean of Engineering and Architecture. With Professor Allen's leadership—the Committee's report declared—and the hearty interest and support of the United States Bureau of Mines in placing a portion of its extensive laboratories at Pittsburgh, Pennsylvania, at the disposal of the Bureau, it is certain that noteworthy results will be obtained. It is the belief of the Committee that the experimental work of the Research Bureau will prove helpful and constructive not only in the field of heating and ventilating engineering but that it will demonstrate the ideal relation of the Society itself to the public in affairs of national and economic importance.

A paper was contributed to the afternoon session by Dr. E. Vernon Hill and Otto W. Arnspach on "Continuation of Work in Dust Determinations." Dr. Hill has gained a wide reputation for his work in this special field. His position as inspector in charge of the Ventilating Department of the city of Chicago has furnished him with a wealth of material for study and research. In conjunction with his associate, he has made many improvements in the methods of dust determination both as regards the mechanical means for obtaining specimens and the working out of formulæ for accurate synthesis of the observations.

Tuesday afternoon's session closed with a paper by Professor A. C. Willard of the University of Illinois, entitled "Report of Progress in Warm Air Heater Research." This paper which forms Bulletin Number 112 of the Engineering Experiment Station, University of Illinois, begins with a preliminary statement concerning the cooperative agreement between the University of Illinois and the National Warm Air Heating and Ventilating Association, and then outlines the principal objects of the investigation as follows:

To get precise knowledge concerning the capacity and efficiency of warm air heaters in circumstances as nearly identical as possible with those of actual installation with leaders, stacks, and registers to constitute a complete heating plant.

In order that a size and type of warm air heater may intelligently be selected for the service to which it is adapted, the investigation is directed toward the determination of satisfactory and simple methods for rating warm air heaters.

Inasmuch as buildings in which warm air heaters are to be installed vary greatly as to cubical contents and structure, it is important to find the type of warm air heater which will give maximum satisfaction in particular cases. In order to accomplish these results, knowledge must be had of reliable methods for determining heat losses, value of insulating materials and other warm air heater accessories. In furtherance of this purpose, it is also necessary to have some means for estimating friction losses in the cold air or recirculating ducts and registers and to reduce these losses to a minimum by the use of right proportions of registers and correct location and arrangement.

Wednesday, June 11, 1919.

The forenoon session of Wednesday, June 11, 1919, was taken up with three papers, as follows:

"Utilization of Sprinkler System Piping for Heating," by A. W. Moulder.

"Remodeling a Heating System," by Helen R. Innis.

"Heating and Ventilating Systems at the United States Government's Smokeless Powder Plant at Nitro, West Virginia," by G. W. Hubbard.

A joint meeting with the National District Heating Association was held Wednesday afternoon in the Elizabethan Room of the William Penn Hotel. A report was received from the Committee on Standard Rules for computing direct radiation; and the rest of the session was devoted to questions bearing upon steam heating systems.

Thursday, June 12, 1919.

An essay on "Cracking of Cast Iron Sectional Hot Water Boilers" by C. R. Honiball of Liverpool, England, opened the professional session of Thursday, June 12, 1919. This was followed by a paper dealing with "Conservation of Coal by Saving Exhaust Steam in the Textile Industries," contributed by William B. Hoyt. The session closed with a paper on "Combustion" by Morgan D. Smith of Detroit, Michigan, the salient features of which are herewith reproduced:

"Far back in the dimmest ages of this world's existence certain portions were covered with dense vegetation, probably great swamp areas, which no doubt rivaled our present-day tropical forests in luxuriance and extent. As season followed season this vegetation lived and died, each season adding a little to the slow accumulation of rotted vegetable matter until with the passing of century after century, masses hundreds of feet in thickness were laid down. During part of this time these areas were submerged; at other times they were dry or comparatively so at least. Later through violent convulsions of the earth itself these masses were buried deeply and so became subject to intense heat and pressure, through which they were carbonized and compressed.

"If we examine coal as we know it, especially the lower forms like the lignite coals of the middle West, we will find that the mass is made up of the carbonized remains of plants and trees embedded together just as they died ages ago. In some cases stems of water plants are seen as arranged by nature in beautiful symmetry of position in such a way that each plant received its share of sunlight and air, the arrangement being much like that of the squares of a checkerboard. The grain of wood is apparent; the veins of leaves are clearly seen; the structure of stems is preserved.

"So we know that coal has its origin in the vegetation of long ago. Peat is probably the first step in the formation of coal. This was slowly carbonized and compacted into lignite; then into the various forms of bituminous coals, which we know as soft coal, and lastly into the final state of anthracite or hard coal. This then, briefly, is the story of the formation of coal.

The Nature of Coal.

"Coal consists essentially of two components, namely: a part which will burn, called Combustible, and a part called Ash which will not burn. To understand coal thoroughly we must take into account both constituents.

"The combustible matter in coal is exceedingly complex but for our purposes we can divide it into two parts, namely: the Fixed Carbon and the Volatile Matter. The fixed carbon is that portion which remains after moisture, ash, gases, tar, ammonia, sulphuric acid, etc., have been driven off by the application of heat. The volatile matter consists of gases, tar, ammonia, acids, oils, etc., which can be distilled from the coal.

"Combustible matter is that portion of coal which will unite with oxygen from air and burn with production of heat. It consists mainly of carbon and hydrogen, but may also include oxygen, nitrogen and sulphur.

The Meaning of Combustion.

"By combustion we mean the rapid union of the combustible matter of coal with oxygen obtained from air. When air is brought into contact with combustible matter at a sufficiently high temperature, rapid union takes place, the combustible being "oxidized," with liberation of heat. Perfect combustion takes place when the combustible unites with the greatest possible amount of oxygen. In the case of carbon, this is true when it burns to form the gas known as Carbon Dioxide, or CO_2 gas. Imperfect combustion takes place when the combustible unites with less than the greatest possible amount of oxygen—in the case of carbon when it burns to form Carbon Monoxide, or CO gas. Per-

fect combustion is what we desire, for then we utilize fully all of the heat stored up in coal. If combustion is imperfect we do not utilize all of the heat. In order that this may be clear let us consider briefly that which happens when combustible matter of coal is burned:

"1. One pound of Carbon burned completely forms 3 2-3 pounds of CO_2 gas and liberates 14.544 British Thermal Units.

"2. One pound of carbon burned completely in air forms 12.52 pounds of gas, the excess over 3⅔ pounds being nitrogen from the air used. The same amount of heat will be liberated as in the case of combustion with oxygen.

"3. One pound of carbon burned imperfectly in oxygen forms 2⅓ pounds of CO gas and liberates only 4,351 British Thermal Units. This is approximately 10,000 British Thermal Units less than when combustion is perfect.

"4. CO gas will burn to form CO_2 gas, in which case we generate 10,193 British Thermal Units per pound of carbon, or 4,368 British Thermal Units per pound of CO gas.

"5. Another possibility confronts us in burning coal. We may oxidize or burn the combustible matter to CO_2 perfectly but through conditions in the furnace the CO_2 may be reduced back to CO, i.e.; perfect combustion may be degraded back into imperfect combustion. In this case we lose heat units for this reaction does not liberate heat but on the contrary absorbs heat and actually chills the fire. 5,842 British Thermal Units are absorbed per pound of carbon in the CO_2 or 2,921 British Thermal Units per pound of carbon in the CO gas formed.

"6. We have Hydrogen still to consider. When one pound of Hydrogen Gas burns it forms 9 pounds of water vapor and liberates 51,892 British Thermal Units, if the initial temperature was 212 degrees fahrenheit and the product is water vapor at the same temperature. If the products are condensed at 212 degrees fahrenheit more heat is liberated, namely: 60,626 British Thermal Units. Hydrogen in coal exists in the so-called volatile, or smoke-producing portion, from which it is evident that if we completely burn the volatile matter, we will also derive all of the available heat from hydrogen, and incidentally we will burn coal without smoke.

"In order that coal may be burned completely it is evident that we must supply the proper amount of oxygen, which we do by admitting air to our fire in regulated amount.

Theoretical Amount of Air Required.

"Air is a mixture mainly of Oxygen, 21 per cent, and Nitrogen, 79 per cent, both percentages being by volume. By weight the oxygen is 23 per cent and the nitrogen 77 per cent.

"One pound of Carbon requires for its combustion 2⅔ pounds of oxygen, or 32 cubic feet at 60 degrees fahrenheit.

"The ratio of nitrogen to oxygen in air is 3.32, from which figure we find that the nitrogen in the air required to burn one pound of carbon is 8.85 pounds.

"The total weight of air required per pound of Carbon is the sum of oxygen and nitrogen which equals 11.52 lb. of air, or approximately 12 pounds.

What Causes Smoke?

"Smoke results when combustion is imperfect. It is usually caused by one or all of the following conditions:

"1. Lack of sufficient air to the fire.

"2. Lack of proper mixture of air with the gases.

"3. Low temperature.

"4. Too small combustion space, so that the gases reach the comparatively cool surfaces before they are completely burned, resulting in condensation of soot and tarry matter which then passes up the stack in the form of smoke.

"Sometimes smoke results from very high temperatures. Under such conditions we have very nearly the theoretical amount of air going to the fire, making difficult the proper mixing of air with the combustible matter of the fuel. In such cases combustible matter passes up the stack in the form of smoke.

Coal Ash.

"It has already been stated that one of the principal constituents of coal is the ash, or that portion which will not combine with oxygen and burn. It therefore constitutes a dead loss in so far as heat value is concerned.

"In coal received from the mines we can distinguish between two forms of ash. One is a part of the coal structure and therefore 'unavoidable.' The other is not a part of the coal structure, but is present because the coal has not been properly cleaned at the mines. This is known as 'avoidable' ash. It consists of slate, mine dirt and material swept up in railroad yards and thrown into coal cars as the easiest way of getting rid of it, etc.

"Let us see briefly what effect Ash has in the economical use of coal:

"1st. Ash directly reduces the heating value of coal, and as the percentage of ash increases, it becomes more difficult to completely burn the combustible matter in the coal and more combustible matter in the coal is thrown away along with the refuse from the fires. This may amount to 50 per cent of the total refuse.

"2nd. Reduction in efficiency greatly increases the amount of coal which must be purchased in order that a given amount of heat may be utilized. With coal containing 21 per cent of ash, approximately 80 per cent more will be required than is the case with coal containing 4 per cent of ash; and approximately 60 per cent more than with coal containing 10 per cent of ash. High ash coal is a direct financial loss to the consumer.

"3rd. High ash means that increased transportation equipment and coal handling apparatus must be supplied. In this country this past year, there was mined approximately 600,000,000 tons of coal, of which the railroads will haul 85 per cent. Hence for each 1 per cent of ash in coal over 10 per cent, the railroad must haul 5,000,000 tons of unnecessary freight per year in this country, or 100,000 cars of 50 tons each. Coal of 18 to 20 per cent ash requires approximately 60 per cent more cars and locomotives than a reasonably clean coal, say of 10 per cent ash. In this country the unavoidable ash runs from 2 to 33 per cent, depending upon the source of the coal; the general average for the entire country being 10 per cent of ash in clean coal. As a rule trouble from ash in the combustion

of coal is not great until the amount passes 12 per cent. If through legislation, or otherwise, the ash content of coal can be limited to 10 per cent (the average avoidable ash for this country), far greater efficiency of combustion will be attained than is the case at present."

The final session of the semiannual meeting adjourned Thursday morning at 11:30 o'clock in order to allow the members to reach the steamboat wharf in plenty of time for the excursion to the McKeesport works of the National Tube Company. Here the delegates and their guests were given every facility for studying the operation of the plant.

DOES NOT NEED FREQUENT CLEANING.

The Lennox Furnace Company of Marshalltown, Iowa, makes the Torrid Zone Steel Warm Air Heater which is shown herewith. This heater consumes most

Torrid Zone Steel Warm Air Heater, Made by The Lennox Furnace Company, Marshalltown, Iowa.

of the gas, smoke, and soot, and as a result does not require frequent cleaning. It is made of high grade, open hearth heavy steel plates and is riveted into practically one piece without packed joints. The Company says it is smoke and gas tight. The heating surfaces of this heater are vertical and allow no accumulation of ashes and soot. The Torrid Zone heater has a diving flue by means of which a maximum amount of heat is obtained from the smoke before it escapes up the chimney. The smoke leaves the main body or steel shell of the heater and enters the diving flue at the top. At this point it can pass by a direct draft to the chimney pipe and should be allowed to do so when the fuel doors are open. The damper should be closed by means of iron rod just above the heater door, when these doors are closed. In this way the hot smoke is forced to pass to the bottom of the diving flue under a hanging partition and back again to the top. The smoke travels eight feet before it enters the smoke pipe, in this process. For further details, installers should address The Lennox Furnace Company, 200 Lincoln Highway, Marshalltown, Iowa.

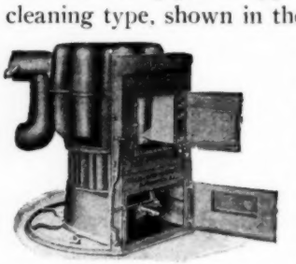
PIPELESS HEATER IS EQUIPPED WITH SPECIALLY DESIGNED CASING.

The Ath-A-Nor Pipeless Heater, which is manufactured by the May-Fiebeger Furnace Company of Newark, Ohio, will be ready for distribution July 1st. A good feature of this heater is the way the inner casing is built. First is the galvanized iron; next, two layers of fourteen-pound asbestos paper; and inside is corrugated bright tin. This insulation extends from the bottom of the inner casing entirely to the top of the cone-shaped hood at the point where the round pipe connects to the hood. The May-Fiebeger Furnace Company declares that it has made extensive tests on this heater and has overcome many faults of most pipeless heaters, such as the poor circulation of air when the castings are at a high temperature, and a current of cold air across the floor to the heater.

The Company states that it uses a face above the heater, the round center grill of which is of sufficient capacity to allow a full current of air to pass from the regular jacket out to the room above. The cold air intake is of equal capacity. In the Ath-A-Nor Pipeless heater the return air is carried down outside of the regular heater jacket, not inside, thus cutting the capacity of air space one-half. The outer jacket is twelve inches larger in diameter than the regular casing. The patented three-way air blast feature, one part of the air going under the fire and two parts over the fire, forms an excellent blast. It is claimed that the combustion produced by this air blast is such that a great amount of heat is generated from the fuel consumed. The May-Fiebeger Furnace Company of Newark, Ohio, will be pleased to furnish further particulars to those writing for them.

MAKES TWO TYPES OF HEATERS.

The American Foundry and Furnace Company of Bloomington, Illinois, makes the American warm air heaters. In order to meet the requirements of all the people, the Company produces two distinct types of heaters, the pipeless type and the open dome self-cleaning type, shown in the accompanying illustration.



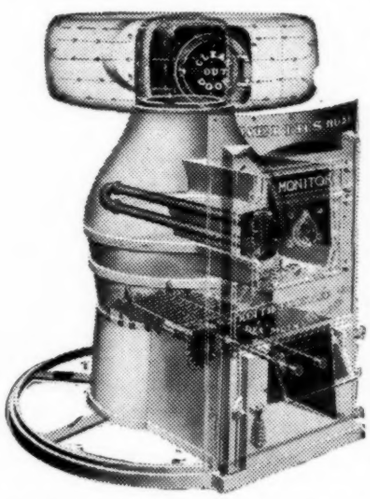
American Warm Air Heater, Made by the American Foundry and Furnace Company, Bloomington, Illinois.

In this heater, the fire pot is extra heavy, cast in one solid piece with perpendicular air cells evenly spaced around the walls and extending from the bottom to the top. The air cells are connected with the fuel chamber by slots through which the heated air is evenly distributed into and over the fire. The combustion chamber is cast in one piece, is large and designed with a series of uniform corrugations which allow for any unusual expansion. The American Foundry and Furnace Company was established in 1876 and it is natural that after more than forty years of successful manufacturing, dealers

should know the merits of the Company's warm air heaters. The motto of this concern is: Prompt Service—Good Goods, and the products of a Company that has such a policy behind it, are bound to be profitable sellers at all times. The American Foundry and Furnace Company has been amply repaid for the years spent in developing high standards of business by its steadily expanding trade. Those desiring further information about the American warm air heaters, should write to the American Foundry and Furnace Company, Bloomington, Illinois.

FULFILLS STANDARD SPECIFICATIONS.

In June, 1917, the Government sent out specifications establishing a standard list of requirements for warm air heaters. It is said that heaters shall consist of the following cast iron sections: Base with casing ring; Grate and ash pit section with triangular rocking grates; Fire pot, preferably in two sections; Combustion chamber; and Circular radiator placed above and around the combustion chamber with a smoke opening in the rear. One piece radiators are preferred and all radiators must have at least one clean-out in addition to the smoke opening. The Keith Furnace Company of Des Moines, Iowa, manufacturers of the Monitor Warm Air Heater, shown in the accompanying illustration, invite comparison of their heater with the Government's requirements. This heater embraces all these specifications, its chief characteristics being efficiency and durability. Dealers should write to the Keith Furnace Company of Des Moines, Iowa, and secure their latest catalog and prices.



Keith's Monitor Warm Air Heater, Made by the Keith Furnace Company, Des Moines, Iowa.

WRITES REGARDING THE RELATION OF MOISTURE TO HEALTH.

An instructive study of the relation of moisture to health is contributed by Professor Huntington of Yale University to the May issue of Modern Medicine. His article, as summarized by Dr. W. A. Evans in the Chicago Tribune, as follows:

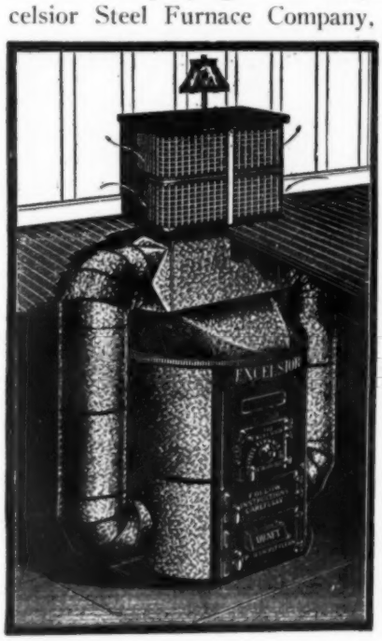
Professor Huntington went about the study in a novel manner. He analyzed the deaths of 60,000,000 people occurring in eighty cities. His special work was to relate these deaths to the atmospheric temperature and humidity and to marked changes in weather.

A variable climate is much more healthful than a uniform climate, even though the latter has an almost ideal temperature. The last statement he illustrates as follows: "Where the climate is highly variable from season to season people acquire a fund of reserve energy which makes them easily able to resist extremes. When they go to uniform climates like California they are unquestionably benefited at first, for they not only enjoy a stimulating change, but go to a place where the temperature is almost ideal—that is, not far from 64 degrees. Their health improves just as does that of most communities in autumn. Yet when they stay in such climates they become more and more sensitive to changes, their power of resistance diminishes, and in the end their chance of long life seems to be lessened." A climate in which the air is even in temperature, humidity, and air movement for a long time does not make for health.

The best mean atmospheric temperature is 64 degrees Fahrenheit. Huntington says whether we take Sicily or Sweden, Florida or Maine, the general health is best when the temperature averages about 64 degrees—that is, when the thermometer falls to about 55 to 60 degrees at night and rises not much above 70 degrees at noon. The best indoor temperature is 64 degrees. The ideal relative humidity is about 80 per cent.

PEDESTAL REGISTER IS ARTISTIC.

The Excelsior Monopipe Pedestal Register, shown in the accompanying illustration, is made by The Excelsior Steel Furnace Company, 114 South Clinton Street, Chicago, Illinois. In addition to being an efficient register, this is an ornament to any room and presents the appearance of a highly finished, artistic piece of furniture. The manufacturers state that owing to the complete absence of friction—which is one of the greatest factors in heat losses—it effects a large saving in fuel. When this Excelsior Monopipe Pedestal Register is used, it permits the installation of one size smaller heater than required when other forms of registers are used. The Excelsior Steel Furnace Company states that it is sold in connection with the Excelsior warm air heater which is constructed especially for use with this register. When the two are used in conjunction with each other, they give ideal results. Those interested in the Excelsior Monopipe Pedestal Register should address The Excelsior Steel Furnace Company of 114 South Clinton Street, Chicago, Illinois, for further particulars and literature.



Excelsior Monopipe Pedestal Register, Made by The Excelsior Steel Furnace Company, Chicago, Illinois.

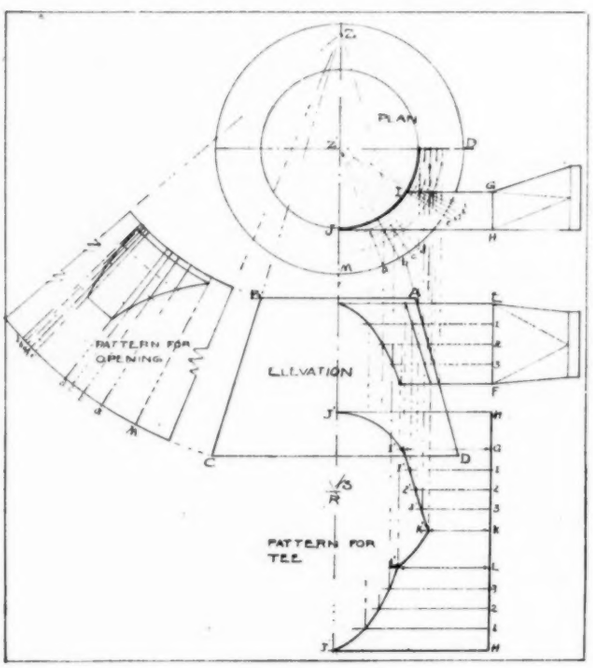
The man who looks for trouble invariably finds it.

PRACTICAL HELPS FOR THE TINSMITH

PATTERNS FOR A RECTANGLE IN A TAPER.

By O. W. Kothe.

Workmen who follow suction pipe work often meet with separators that have a double cone for its design. The inlet being a rectangle is tapped into the top cone the same as here shown and offers quite a problem to the metal worker. First draw the elevation of taper A-B-C-D, working from the center line to keep the taper true. Then extend the side lines to



Patterns for a Rectangle in a Taper.

the apex Z. In its proper position draw the side view of inlet letting E-F be the height. Divide this into equal spaces as 1-2-3 to insure greater accuracy in establishing the miter. From each of these points draw line toward the center line. Next draw the plan, describing the arcs for the top and bottom bases from the center Z'. Now where each line as E-1-2-3-F intersects the slant line A-B, erect lines to the center line Z'-D. With dividers set to Z' as center and each one of these points as radius, describe arcs in the quarter circle as shown. Tangent to the top J, of plan start the inlet, letting G-H be the width, and draw lines as G-I and J-H. Observe where these lines cross the short arcs. These are the points of penetration of the inlet and the taper as they appear in plan. From each of these points drop lines crossing those horizontal lines of similar number in elevation. This gives the miter lines in elevation or the points of penetration between the inlet and the taper. The pattern for tee can be laid out either from the elevation or the plan, in this case we develop it from the elevation. Set the stretchout for two as at H-H and draw horizontal lines, after which drop lines from each point in miter line crossing those in pattern in points J'-I'-1'-2'-K'-L', etc. This gives the pattern for tee. In developing the pattern for opening draw radial line from Z' in plan through each point of intersection in I-G and J-H, establishing the distances i-h-g-f-e, and d-c-b-a. Describing the part pattern for cone we pick these spaces and step them off on the lower arc as M-a-b-c-d, etc. The opening then described into pattern using those points on side line A-D as radius, and sweeping them to similar radial line in pattern. This gives us the shape of opening shown. The draftsman should lay out the full cone when working on these drawings and add all laps, also lay out the square to round transition piece.

HONORS SHEET METAL MANUFACTURER.

Sentiment as such is not a major motive in the chosing of officers to manage a chamber of commerce. Ripe judgment, wide experience, and breadth of view are the qualifications which usually actuate the selection of men for so important a function. Consequently, there is a well-merited honor in the election of Arthur P. Lamneck to the Board of Directors of the Columbus, Ohio, Chamber of Commerce. As vice-president of the W. E. Lamneck Company of that city and vice-president of the National Association of Sheet Metal Contractors, he has won prominence by virtue of constructive ability, courtesy, and progressiveness.

MOVES TO A BETTER LOCATION.

Tanner and Company of Indianapolis, Indiana, are about to move after being in their present location since 1885. They need more room to take care of their rapidly expanding trade; and in their new location they will have the advantages of switch tracks connecting them with the outside world. They expect to occupy their new quarters at 409 to 413 South Pennsylvania Street, Indianapolis, Indiana, about the first of September.

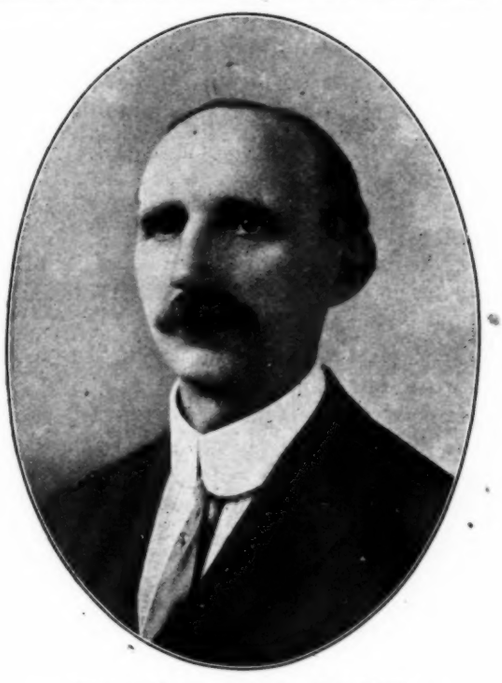
EXTENDS SYMPATHY TO FRANK CHEW.

In the hope that it may help soften his grief over the loss of his wife, who dropped dead at her home in Newark, New Jersey, Friday, June 6, 1919. the sincere sympathy of American Artisan and Hardware Record is offered Editor Frank Chew. The sheet metal trade in general has the highest regard for him and feels keenly for his bereavement.

In order to win success a man must first fall in love with his work.

Convention of National Association of Sheet Metal Contractors Surpasses All Records.

Expansion of the sheet metal trade in many new directions by collective effort through educational publicity, higher standards of quality and workmanship, and more enlightened cooperation among the members of the organization, was the purpose which animated the fifteenth annual convention of the National Association Sheet Metal Contractors of the United States, held June 10, 11, 12, and 13, 1919, in the Assembly Room of the New Southern Hotel, Columbus, Ohio. A comparison of the proceedings of this meeting with those of former gatherings of the Association discloses the significant fact that it surpassed all records in the importance and variety of subjects discussed as well as in the enthusiasm and progressiveness of the members who attended its sessions.



George Harms, Retiring President
National Association Sheet Metal Contractors.

Tuesday, June 10, 1919.

Preliminary to the opening of the convention a national and state directors' and trustees' meeting was held at 9 o'clock in the morning for the consideration of matters of an executive nature. The convention was formally inaugurated at 2 p. m. by an address of welcome from George Karb, mayor of Columbus, Ohio. He was followed by the Honorable James M. Cox, Governor of Ohio, who spoke upon the subject of "Reconstruction." An appropriate response was made by George Harms, president National Association Sheet Metal Contractors. Announcement was then made of the following committees:

Committee on Credentials:
A. E. Munkel, Columbus, Ohio;
George Bohm, Philadelphia, Pennsylvania;
John Neuman, Springfield, Illinois.

Committee on Resolutions:
R. J. Braley, Providence, Rhode Island;
D. M. Haines, Chicago, Illinois;
John A. Pierpoint, Washington, D. C.

Committee on Auditing:
(To audit Association books)
E. B. Langenberg, St. Louis, Missouri;
E. W. Skinner, Warren, Ohio;
Oscar A. Hoffman, Milwaukee, Wisconsin.
(To audit Journal books)
Frank Eyenatten, Peoria, Illinois;
W. F. Angemeyer, Pittsburgh, Pennsylvania;
W. E. Feinter, Cleveland, Ohio.

The report of the Warm Air Heater Committee, which was scheduled for the morning session of Wednesday, was advanced to the opening session of the convention Tuesday, June 10, 1919. It was read by the Chairman of the Committee, E. B. Langenberg. A number of pressing questions were presented by the committee for the consideration of the assembly. The complete text of the report is as follows:

Report of the Warm Air Heater Committee to the Convention of the National Association of Sheet Metal Contractors, June 11, 1919, at Columbus, Ohio.

"In submitting a report this year, the Warm Air Heater Committee feels that more lasting, beneficial results can be obtained by open discussion.

"There are a series of important questions confronting the industry from two angles, one affects the manufacturer, and one affects the dealer.

"It is the purpose of this Committee to bring these questions before the Convention in such a form that the Convention can go on record as endorsing the prevailing sentiment, and lend its strength toward development and improvement of the warm air heater industry.

"The resolutions adopted at this Convention two years ago, and repeated in the report of the Warm air Heater Committee last year, bear repetition again this year, and should be repeated at every opportunity so that the principles enunciated would ever remain fresh in the minds of warm air heater installers.

They are as follows:

"Whereas, The welfare and prestige of the warm air heating system has been severely injured by the use of poor warm air heaters, and poor installation solely in the interest of those who desire low prices.

"Be It Resolved: That the National Association of Sheet Metal Contractors urges its members to refuse to meet the demands of those who erect dwelling houses with the sole purpose of cheapness:

"Be It Resolved: That its members urge the use of warm air heaters and that character of piping, both as to size and shape as well as workmanship, which will insure to the ultimate occupant economy in fuel and a comfortable temperature in the building; and

"Be It Further Resolved: That our organization take this stand in the interest of the general welfare of our country through the protection of the health and comfort of its citizens.'

"The foregoing resolutions should be reaffirmed at this Convention, and resolutions adopted on some of the following subjects which will establish our position as a part of a great industry.

"This Committee does not feel itself competent to pass judgment on these various subjects, and will give but an outline, expressing their opinion, and then ask for the privilege of the floor to bring out the sentiment of the Convention.

"The first question is, is Warm Air Heating receiving the support of the Sheet Metal Contractor that it should.

"The Committee believes that many dealers making a specialty of warm air heater installation work are

Frank D. Higgins, First Vice-President National Sheet Metal Contractors' Association.

giving their best thought and effort to the sale and correct installation of heating plants that they handle. The percentage of this class of dealer is quite small however when compared to the total number of dealers who do warm air heater installation work. Possibly about 10 per cent. The other 90 per cent having other lines in their business do not give warm air heating installation the proper attention it should receive and are quite indifferent to the success of a plant and the results that will accrue to them by doing good work. This large percentage do not use available data, and consequently are at a loss to understand why their business falls off, when the whole fault can be traced to inefficient installation.

"What influence is the one-pipe idea exerting toward the development of warm air heating?

"There being two sides to this question; the first, or good one, being that the so-called Pipeless Warm Air Heater has undoubtedly opened up a big rural field of distribution with its possibilities of developing the field of the regular and more satisfactory pipe system is about the only factor which can be considered as worth careful thought.

"On the other hand such exaggerated claims are made, and such inefficient agencies are installing these systems that unless some action is taken it will take years of hard work to overcome the detrimental effects such work will have on the warm air heater industry. By inefficient agencies, we refer to the department stores, furniture houses, druggists, grocers, and what not who are being given the agency for this type of warm air heater, and who are misrepresenting conditions and facts to the public through advertising which ought to be condemned by the Associated Advertising Clubs of the world.

"It is about time this organization wagged its tail instead of letting the tail wag the dog.

"Does state legislation offer a solution to efficient installation of Warm Air Heating plants?

"As the State of Michigan has recently passed a law governing this question, and has not had time to prove anything by its workings, this question can hardly be answered at the present time.

"Possibly our friends from Michigan can give us more detailed information in regards to this.

"What are the dealers doing to develop the use of warm air heat?

"Does the mail order house selling to consumers have a place in this industry?

"Does the establishing of branch houses by manufacturers assist the development of warm air heating?

"Would a course in salesmanship developed by the Warm Air Heater Committee assist the dealers in combating unfair competition?

"The above questions offer a big field for discussion, and it is the committee's desire to have the sentiment of the Convention expressed either in the form of motions or resolutions, with the idea that the Membership at large, and the industry as a whole will be benefitted.

"The National Warm Air Heating and Ventilating Association is expending a large sum of money in a testing plant at the University of Illinois, and a full report is now available in printed form of the results of this last year's work. This work will be continued and will be of great value to not only the manufacturers but the installers. Additional data will soon be available from the testing plant of the American Society of Heating and Ventilating Engineers at their Pittsburgh plant.

"With these two forces at work, interest should be stimulated in the warm air heater installer, and he should make an effort to avail himself of the results obtained, and contribute his share in the development of warm air heating.

"The United States Fuel Administration has published the Second Edition of 'Fuel Facts,' and the information contained therein on warm air heater firing will be of unestimable benefit not only to the dealer, but to the public.

"The Committee desires to call attention to the many discussions that are carried on in the trade papers which ofttimes provides a remedy for a difficult situation.

"With the advent of an era of prosperity never

before equaled in the history of the United States, an obligation rests upon the Warm Air Heater Industry as a whole to make a consistent and energetic effort to place warm air heating in the position it is justly entitled to, and this can only be done by the conscientious efforts of every manufacturer, salesman, contractor and tinner.

"It is the committee's one wish and hope that its report in 1920 will show tremendous progress in warm air heating."

Tuesday evening at 8:15 o'clock a smoker and get-together meeting was held in the New Southern Hotel. The delegates and their male guests were entertained with vaudeville and old-time minstrel performances. Cigars and stogies were freely distributed to all devotees of Our Lady Nicotine by the Entertainment Committee of the Columbus Local. A. E. Munkel, W. J. Kaiser, Elmer J. Ogle, and L. G. Kallmerten, who composed this committee, deserve great credit for the able manner in which they conducted the evening's function. The meeting came to a happy conclusion with an appetizing luncheon.

Wednesday, June 11, 1919.

The morning session of Wednesday began with reports of the officers of the Association. A thoughtful review of conditions, with sage advice to the members, constituted the report of President George Harms, the text of which is herewith appended:

Annual Report of President George Harms, to the Convention National Association Sheet Metal Contractors of the United States, Columbus, Ohio, June 11, 1919.

"The year just passed, together with several preceding it, have been of great importance. The great world war, in which our country has been very active, has of necessity changed many things. Before the war, our Government showed a very strong disposition against associations of industry, apparently considering them as a means of advancing prices beyond legitimate profit and fearing that through organization competition would be eliminated.

"To mention prices, profits, or loss in an association meeting, was considered as restraint in trade and therefore a violation of the law and probably subject the members to fine or even imprisonment.

Lack of Organization Leads to Bankruptcy.

"It was, and is, entirely right, that the consumer be protected against improper combinations, through which the public may be forced to pay exorbitant prices, but it was never the intent of the law, that manufacturers, jobbers, and merchants be deprived of a fair margin of profit. It is true, however, that it did, to a certain extent, have the latter effect and many concerns have gone into bankruptcy, due entirely to lack of organization.

"In respect to organization, the war has changed the attitude of our Government entirely. In the preparations for war, it was quickly demonstrated that to accomplish anything it was most necessary to be thoroughly organized; that in union only, there is strength; and to be divided, meant absolute defeat.

War Proved Need of Concerted Effort.

"In the creation of War Service Committees, the Trade Associations were directly appealed to, as quick action was of great importance. This could be had only through this course. It was even suggested that those trades not already organized, get together, so that their part in the Government's problems could be handled more systematically.

"Gentlemen, the great industry that you represent has taken a very active part in all that transpired in the years just past, and you may all be proud of the fact that you are engaged in this business. Conditions mentioned before, have shown their effect on our association. As organization became a necessity for our Government, it proved to many that it was useless to try alone and many members have been added to our ranks.

"The war with all its dreadfulness is practically a thing of the past. Our noble boys have shown that for courage, resourcefulness, and bravery, there is none on earth that can compare with them. Our flag has proven to be the real guiding star and they kept it untarnished and brought it back home just as clean, just as red, white, and blue as it ever has been. We can justly be proud of our flag, the great emblem of freedom and we owe our most sincere tribute to the boys who so gallantly defended it and us, and who by great sacrifices have conquered our foes and brought victory for our cause.

David M. Haines, Elected Fourth Vice-president National Association Sheet Metal Contractors.

Pays Tribute to the Red Cross.

"In our tribute to the boys, we must not forget those who as the angels of mercy, have been always ready to alleviate their pains, to look after the sick and wounded and in a measure replace those at home. I have reference to the ladies of the Red Cross.

"Last, but by no means the least, are the Mothers, Sweethearts and Sisters of the Boys. They bid them good-bye and God Speed with a heavy heart, they toiled for them at home, they always thought of them and prayed constantly for their protection. Many hearts were broken, many tears were shed. Some have their loved ones home again, others have only the fond remembrance and the satisfaction that their

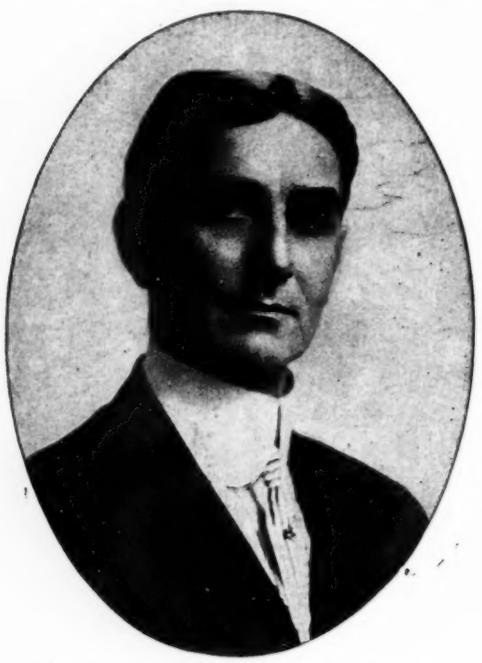
boys have served their country well, and have paid the great sacrifice.

'The Bravest Battle that ever was fought,
Shall I tell you where and when?
On the maps of the world you'll find it not—
'Twas fought by the mothers of men.'

"I said before, that we can be proud of the Sheet Metal Industry and the part we have taken in the war. If we stopped right here, it would show a good start, but a rather dismal finish. The future lies before us and we must carry our share of the responsibilities. The opportunities before us are numerous, but if we are content with the past and pay little or no attention to the present, the future will not be very profitable.

Demand for Buildings Is Enormous.

"There never was a time when the demand for houses, hotels, etc., was greater than right now. These must be built and their construction will require large amounts of material and labor. It is true material is high, but when you consider that the production of most materials, from the ground out of which it is dug, or the forest from which it is cut, comprises about 75 per cent labor, and as labor of every description is high, the present prices are not very far off.



John H. Hussie, Elected Trustee National Association Sheet Metal Contractors.

Prices Will Continue on High Level.

"To live according to American standards, labor cannot be reduced. Knowing this, we cannot expect cheaper material. To perform our part in the future progress, we must forget that material was formerly cheaper. But when you do think of the past, remember that labor also was less, and don't forget that your profits were small and your business often showed a loss. The real way to create business, is to start yourself, be an optimist. Have confidence in the future, and show it through your actions. If you need materials, buy them. Don't holler 'High prices,' as you can't back it with a good argument. Preach and practice confidence, good will, and prosperity. Anything you say and do has an effect on your neighbor, on your customer and on business in general. Start something and others will fall in line. Stand still and you hold up the procession.

"Pessimism is a dangerous disease and very contagious. Optimism, however, brings sunshine, health, happiness and prosperity.

Preach the Gospel of Cooperation.

"The splendid showing in our Association should be an inducement for still bigger things, there are still thousands of sheet metal contractors who are not members. Let us keep on preaching the gospel of organization and cooperation and show them the benefits derived from it. As our treasury is in a fairly good condition, use some money for organization work. Don't forget that every member owes it to the Association, also, to his competitors to help in this work. Do not depend on the officers to do it all, your efforts along this line will surely bring good results.

Counsels Persistent Advertising.

"Use everything within your means to advertise your line. Do not allow other materials to be used, without an effort on your part to show architects and consumers that sheet metal is the best for the purpose. This applies principally to *cornices* and *roofing*.

"As sheet metal for this purpose makes an absolutely fire retardant job, we need not hesitate to recommend it. Cornices can be made very ornamental at the same time cost less than terra cotta or stone. Every sheet metal contractor, every local association, should consider it their duty to interview architects and builders. You can induce them to use metal for both cornices and roofing, but you must show that you personally have confidence in your line.

Sound Material and Workmanship.

"Be very particular to use only good grades of tin and iron. Don't buy anything just because it is cheaper. Buy the best and pay the price. Employ the best mechanics you can get and insist that none but good work leave your shop. Let it be known that you are a member of one of the best trade associations, and that its members stand for *quality*, first, last and always.

The Question of Apprenticeship.

"Insist that your apprentices learn the trade thoroughly. Give them proper instruction wherever possible, send them to apprenticeship schools or help them to take correspondence school courses. Help them in every way to become good mechanics.

Need of Favorable Legislation.

"Other industries, and particularly the trades unions, have been very active to secure legislation favorable to their particular lines. Many laws have been enacted that are detrimental to the proper conduct of merchandisings. Our representatives, congressmen and senators, are overwhelmed with requests for laws covering everything imaginable. Many seemingly unimportant measures become very serious obstacles to business. It is very important, therefore, that our Association watch both state and national legislation, so as to safeguard the sheet metal industry. The standing committee appointed for this purpose, should keep in close touch with the situation, both for the prevention of unjust laws and to suggest measures that will benefit our industry. All association members

should advise this committee regarding legislation in their particular territory.

Advantages of the Warm Air Heater.

"The safeguarding of health has been given considerable attention and we should assist the authorities in every way possible both to enact and enforce laws that are intended for this purpose. The proper heating of our homes is in every sense a health measure. It is fully as important as plumbing and sanitation Laws and ordinances covering the latter, are found in every city and state. As improper heating is often attended with sickness and death, and proper heating of homes provides health, comfort and pleasure. That warm air heating for residences is preferable to any other system has been fully demonstrated. This is a very important and profitable branch of the sheet metal industry, and deserving of serious attention.

"Laws and ordinances providing for proper installation should be enacted and enforced. The building codes of some cities have provisions covering this work, the state of Michigan has lately adopted laws of this nature. Every local, state, and the National Association of Sheet Metal Contractors should consider laws and ordinances; assist those in authority to draw them up; and insist that they are adopted and enforced.

"The Warm Air Heating and Ventilating Association has already done much to provide for better warm air heaters, but the most important part of a heating plant lies in the installation.

Importance of Correct Installations.

"The installation of plumbing, electric wiring, etc., requires licensed mechanics. They are of not as much importance as warm air heating. The proper licensing of warm air heater dealers and installers, would stop the present practice of implement dealers, carpenters and handy men selling and installing heating plants. Properly to convey the heat from any warm air heater requires direct connection to the different rooms. This must be done with sheet metal pipes and is, therefore, a distinctive branch of our business.

"Manufacturers of warm air heaters may consider tonnage rather than results. Let us work for results, which at the same time means more business and profits for those legitimately engaged in this line.

"Allow me to use these means to thank our very efficient Secretary, Mr. Seabrook, for his efforts in behalf of the Association. It has been a pleasant duty to work with him. Our long tried and trusted Treasurer, Mr. Fingles has again shown his ability in the handling of our finances, Cooperation between the Secretary and Treasurer and the President's office has always been manifest.

"I wish to thank the officers and trustees for their support, also all members for the friendship shown me, and I sincerely hope that this will always continue the same.

"I owe special thanks to the trade papers for the kindness and consideration extended to both the Association and me personally."

The report of Secretary Edwin L. Seabrook gave much interesting data relative to the growth of the organization. Of special significance was his plea for more favorable legislation and for greater vigilance on the part of business men to prevent the enactment of laws which are detrimental to the general commercial welfare of our country. His report is as follows:

Report of Secretary Edwin L. Seabrook to Convention of National Association of Sheet Metal Contractors, June 11, 1919, at Columbus, Ohio.

"The year just closed shows progress in every department of our association work. We come to the Fifteenth Annual Convention with a larger membership than ever before. The receipts from per capita tax and other sources, usual to our work, have been the largest of any year in the history of the Organization. The officers and entire membership can look with satisfaction on the results of the past year.

"If the business situation is analyzed it will be seen that the trade or business organization is becoming more and more a factor in the business of the nation. When America plunged into war the Government

Edwin L. Seabrook, Re-elected Secretary National Association Sheet Metal Contractors.

most naturally turned to the trade organizations for assistance and the response to the requests of the Government from these business organizations was not lacking. In these days of reconstruction it is also quite natural that the Government and business in general should look to the organized units of the business world for a working out of the problems that confront it and their assistance in getting back to normal conditions. In all these matters this Association has done and is taking its part.

War Service Committee.

"One year ago the War Service Committee gathered information from all parts of the country regarding shop capacities and character of work that could be performed. These were classified under five different headings and forwarded to the purchasing departments in Washington. Taking one classification as an illustration—hollow metal window frames —our lists submitted to the departments showed the manufacturers of these in every section of the country. No matter from what section or city an estimate

was desired on this class of work (or any other, for that matter) the firms competent to do this could be seen from our classifications almost at a glance.

Affiliated with Chamber of Commerce.

"As the Chamber of Commerce of the United States is the nucleus around which are gathered the great number of business organizations of the country—local, state and national—it was quite apparent that our own Association should become a part of this great organization, with which nearly 1,000,000 business men of the country are affiliated. Immediately after the Atlantic City convention application was made for membership and our Association was duly admitted into the Chamber of Commerce of the United States. Membership in this Association, therefore, carries with it membership in the Chamber of Commerce of the United States.

"It is hardly necessary to say that the influence of this great organization of business men will assert itself in the law making bodies—state and national—for proper business legislation.

Statistics of Membership.

"Our membership has steadily increased during the year. Locals have been organized in Zanesville, Newark and Warren, Ohio; St. Paul, Minnesota; Lowell, Massachusetts, with a total membership of 39.

"Other local organizations have been formed in Atlantic City, Plainfield, Newark, New Jersey; Tacoma, Washington; Norfolk, Virginia, all of which have the matter of affiliating with the National under consideration, apparently only waiting to be well organized before becoming a part of the National Association.

"The individual membership increase is the largest in the history of the Organization. During the year 63 individual members affiliated, these coming from every section of the country. Among the individual class there was 2 resignations, 2 retirement from business, 1 death, and 8 dropped for non-payment of dues. Total individual membership is 267.

"There have been but slight changes in the local membership; some locals showing increases, and other decreases, but the increases outnumber the decreases, so that the membership of the locals, not including those affiliating during the year, is larger than one year ago.

"The State Associations have not been idle by any means. These show new members and the increase from this source is commendable.

"During the year 264 new firms have affiliated with the National Association either through the locals, state or individually. Of this number 175 affiliated through the locals; 26 from the State Associations, and 63 individually.

"The record for the largest local membership is held by Chicago. The membership reports from the locals show less delinquents and suspensions for non-payment of dues than in previous years. These reports, herewith presented, show the total enrollment, delinquents, loss and gain of each local.

Membership Committee.

"During the year President Harms appointed a membership committee of one from each State. These committee men were to select assistants and to work for new members. This was a good move and a number of individual members have been secured as the direct result of the activities of these committee men.

Finances.

"The finances of the Association have gone forward with the increased membership and its other activities. The balance in the treasury is larger than any previous year. At the Milwaukee Convention the treasurer was authorized and instructed to invest a portion of the surplus in war savings stamps. The amount so invested was $834, which at maturity will be $1,000. The attached financial statement shows the various sources of revenue, the disbursements, and a comparison of these with last year.

"The report of the Board of Trustees will show the various amounts of cash on hand and the total assets of the Association.

The Journal.

"The action of the Peoria Convention, three years ago, in taking over the Journal, owning and publishing it, has been fully justified by the results. The Journal has been favored with a most liberal amount of advertising, which is showing a continued and healthy growth.

General Conditicn.

"The general condition of all the local associations is good. In some instances a much stronger word might be applied to their activities. Most of the locals have become firmly established and there has been less difficulty in holding the local organization together. There are only two locals, so far as I have been able to determine, that are not active, and it is hoped that these two can be reorganized and brought back to activity.

"Much might be said about the various methods of work carried on by the different local associations, but space forbids. No doubt discussions in the different sessions and privately among the delegates will bring out many of these profitable features of local association work.

"Taking the National Association as a whole, its condition in every respect was never better. It is in a splendid position to reach out and carry on its activities which are opening up in this new era, not only of business generally, but of the business organization in particular.

Relations with Manufacturers and Jobbers.

"The relations between the manufacturing and jobbing interest have been very harmonious, and there can be no good reason why they should be otherwise. The welfare of the industry is mutual between the source of supplies and the dealer, therefore the more of the co-operative spirit the better.

Cooperation Between Organizations.

"There is a growing tendency among trade organizations whose interests are practically identical to ally themselves more closely with each other through joint conference committees. This is particularly true of the Master Plumbers and Steam Fitters. A joint conference committee exists between these two organizations, the service of which has very cordially been tendered this Association. The report of the Committee on Trade Relations and Policy will present a definite proposal in this respect.

"Our Association now ranks among the big trade

organizations of the country. Its influence is solicited by other organizations in every movement of a national character affecting the business interests of the nation.

Must Take Part in Legislation.

"This being a business organization and representing one of the largest industries of the country, is there any reason why in this convention it should not express itself very definitely on the problems confronting business in legislation and other matters? Does the average business man realize that during the five years from 1912 to 1917, over 62,000 laws were passed by our National and State law making bodies? This is an average of over 12,000 new laws every year. Of this great mass of new legislation, less than 4 per cent was favorable to business, 56 per cent were socialistic and 72 per cent pertained to class distinction in some form or other. Out of every 100 new laws only 4 were favorable to business, and if these

Julius Gerock, Newly Elected Treasurer National Association Sheet Metal Contractors.

were analyzed probably most of them would represent only a feeble effort in that direction.

"If business men should be permitted by law to combine for exchanging ideas, experience, data, and other matters relating to the production and distribution of their products, is there any reason why they should not so express themselves and ask that these restrictions be removed?

"This Organization is large enough and the interests of the sheet metal industry are likewise, to warrant it in giving expression on any of these subjects.

"The reports of the various standing committees will give the work in detail that was committed to them.

"I wish to thank all the officers of the National Body, the secretaries and others from the different locals and the individual members, for the help they have rendered during the year.

"All too briefly this is the story of the work of the year. No report of this nature can do justice to the activities of the Association, its uplifting influence, nor present to the outsider a true picture of the benefits of whole-hearted, earnest membership. We can present to the sheet metal industry a trade organization of high business ideals, active, vigorous, growing in membership and influence. It believes in doing the reasonable, sensible, practicable things, rather than exalting itself over conceived results never achieved. Its undertakings, so far as possible, are carried to completion.

"With the inspiration of the work of the fourteen years that are behind us—'Let's Go.'"

The report of the Treasurer, W. A. Fingles, gave evidence of a gratifying condition of finances. Indeed, it may be said that few organizations receive such ample returns from money expended as the National Association of Sheet Metal Contractors.

Manifestly, the results capable of achievement through organization are in proportion to the activity and cooperation of its members. If meetings are neglected, these results are lessened. Therefore, it becomes a matter of urgency to increase the numerical participation of the members in the gatherings. This timely topic was treated in an instructive manner by President George Harms under the title of "How to Get One Hundred Per Cent Attendance at Association Meetings."

The reports of the Lecture, Legislation, and Overhead Expense Committees were followed by an address by W. D. Wall on "Simplified Method of Bookkeeping and Cost Accounting and How to Apply It to the Average Sheet Metal Shop." The morning's session closed with a discussion of problems presented through the Question Box.

Trade relations constituted the chief subject of the afternoon session which convened at 2 o'clock. Of special interest was the report of the Apprenticeship Committee which was submitted in the following form:

Report of the Apprenticeship Committee to the Annual Convention of the National Association of Sheet Metal Contractors in Columbus, Ohio, June 12, 1919.

"In submitting the Sixth Annual Report of the Apprentice Committee, we must again call your attention to our report made at the Milwaukee Convention, that the principal function of this committee is confined to giving advice to our members and associations, on how to proceed in their efforts to establish apprentice classes in their localities. Such being the case, it logically follows that unless we have inquiries from you we can not render such service. During the past year we have had but three inquiries for advice, which we have promptly answered and believe had some practical results. This lack of inquiries we believe was due to the unusual shifting about of mechanics from one job to another, caused by the demand for war work; which should not be the case in the future.

"The course of studies in sheet metal work as approved at the Cincinnati convention covers the entire subjects in a thorough manner and will enable the apprentice and journeyman, who has a public school education, to learn and understand all of the problems that may arise in the sheet metal business. But like

all education the student must have a desire to learn and be willing to give his time and energy, to learn the arithmetic, drawings and geometrical developments, which are the foundations of all sheet metal articles. There are no secrets in this part of our trade. It is an exact science founded on logical reasoning and practical experience; which any individual

Paul F. Branstedt, Elected Trustee
National Association Sheet Metal Contractors.

of average intelligence can learn and understand. He furthermore has the advantage of seeing the various shapes and developments demonstrated in his every day work, to assist him in grasping the logical reasons conected therewith.

"The greatest difficulty we have found is to make the apprentice or journeyman appreciate the importance of constructing a mental picture of the article and its process of construction, before the actual work is started. This mental picture with the drawings showing the various details of construction, represents the theory of sheet metal work, which in actual practice must be done to build the desired article. When theory and practice are properly combined, they represent the highest type of workmanship, of which theory is entitled to the greatest credit.

"As you gradually get back into normal business conditions, you should enlist the cooperation of your younger mechanics to take up this study, so you both may be prepared to perform the work with which you are entrusted."

The report of the Apprenticeship Committee was followed by an address on "Trade Schools" by Chelsea L. Bailey and by a general discussion of the reports of the Trade Relations and Policy Committee, Fire Prevention Committee, Apprenticeship Committee, and Trade Development Committee.

F. O. Schoedinger then gave a talk on "Trade Conditions" which was well received by the Convention. The session came to an end with the Question Box.

In the evening at 8 o'clock the delegates and their guests met in the New Southern Hotel for a trip to Olentangy Park.

About thirty-two sheet metal contractors, who have been members of the National Association of Sheet Metal Contractors for at least ten years, met at a dinner in Hotel Deshler, Wednesday, June 11, and formed the Old Guard. It is expected that this body will be helpful in maintaining the morale of the National Association and offering incentives to younger members.

Thursday, June 12, 1919.

OHIO DAY.

The Fifth Annual Convention of the Sheet Metal Contractors' Association of Ohio was held in conjunction with the fifteenth annual convention of the National Association of Sheet Metal Contractors and Thursday was set apart for this purpose on the program of the national organization. The sessions were presided over by J. Weigel, President of the State Association. His annual report to the meeting was as follows:

Address of President J. Weigel to Convention of Sheet Metal Contractors' Association of Ohio, June 12, 1919, Columbus, Ohio.

"In closing my year as president of your honorable Association, I desire to express my heartfelt thanks and deep appreciation of the honor you have conferred upon me and the co-operation manifested by you at all times in our work. It has, indeed, been a very pleasant year. I have learned to have a high regard for every member of the Association and the friendship made during my term of office will be to me in all the years to come, among the most pleasant of my recollections.

John Weigel, President Sheet Metal Contractors' Association of Ohio.

We Are Confronted With Great Problems.

"We are still passing through the greatest era in the history of the world and we are confronted with the greatest problems since time began. Every man has a part to play and the members of this Association have a duty to perform in the solving of these problems. If each will do his share, then all will be well.

A few years back a few men realized that in order to become a factor in the business world associations must alter their methods and points of view, and with this in mind they determined that to make an association a practical and profitable success it must offer something that will be a benefit to every one in the business.

"Subjects should be offered and discussed such as trade protection, blackboard talks by men in the trades, cost factor and all points of interest to the individuals whom we are trying to educate in the way of doing business in a proper business-like manner.

Benefits of Association to Small Shops.

"The owner of the smallest one or two man shop must be afforded the opportunity to make such progress that he can become entitled to respect by all with whom he comes in contact by noting and bettering the improvement of his fellow. That he is not exempt from keeping a proper set of books because he is a mechanic, and that there are many sources of information at his hand to draw from is evident.

"There are so many ways in which we should try to bring these men into our fold and teach them the proper way to be business men in the sheet metal trade.

"In concluding my address I wish to thank all the officers and members for their cooperation during the past year. I wish especially to thank the secretary for his untiring efforts on behalf of the Association."

The Ohio Sheet Metal Contractors' Association elected the same officers and Executive Committee to serve another term, namely:

President: J. WEIGEL, Cincinnati,
Vice-president: A. E. MUNKEL, Columbus,
Treasurer: W. J. BIRMINGHAM, Cleveland,
Secretary: W. J. KAISER, Columbus.

Executive Committee: M. B. ARMSTRONG, London; GEORGE TESMACHER, Cleveland; WILLIAM STECHOW, Cincinnati; WILLIAM E. MILLER, Dayton; W. E. LAMNECK, Columbus; and J. D. GERKINS, Toledo.

It was decided to hold the next State Convention in Toledo, Ohio. Several new members were added to the Ohio organization, bringing the total membership up to almost three hundred.

Thursday afternoon was spent by the delegates in an automobile tour of the city of Columbus. The first stop was made at Franklin Park where a group photograph of the party was taken for the official records of the Association. In the evening a banquet and dance were given at the New Southern Hotel.

Friday, June 13, 1919.

Only one session was held on the last day of the convention, namely, at 9:30 a. m. It was devoted to a report of the Board of Trustees, report of the Committee on Resolutions, report of E. B. Langenberg, delegate to the convention of the Chamber of Commerce of the United States, and a general discussion of topics suggested during the sessions.

Under the leadership of Mrs. J. W. Brazier, a Ladies' Entertainment Committee of twenty-seven members made the sojourn of the feminine guests of the convention pleasant and interesting by theater parties, shopping tours, luncheons, automobile trips, and visits to places of note in the city of Columbus, ending Thursday evening with the banquet and dance in the New Southern Hotel.

Retiring President George Harms was given a diamond and pearl scarf pin in token of the convention's appreciation of his servicves to the Association. Paul F. Branstedt made the speech of presentation on behalf of the members.

The election of officers resulted in the choice of the following men to conduct the affairs of the Association:

President: ARTHUR P. LAMNECK,
First Vice-president: FRANK B. HIGGINS,
Second Vice-president: JOHN A. PIERPONT,
Third Vice-president: GEORGE P. WERNER,
Fourth Vice-president: DAVID M. HAINES,
Treasurer: JULIUS GEROCK,
Trustees: R. J. BRALEY, J. H. HUSSIE, PAUL BRANDSTEDT, GEORGE HARMS, EDWARD HILDEBRAND, LOUIS LUCKHARDT, and SAMUEL MENCZER.

As a result of the vigorous agitation carried by the Local of Peoria, Illinois, that city was chosen as the meeting place of the next convention.

METAL BRANCH NATIONAL HARDWARE ASSOCIATION HOLDS EIGHTH ANNUAL MEETING.

The need for a conference to bring about more closely concerted action in matters affecting the trade gave uncommon importance to the eighth annual meeting of the Metal Branch of the National Hardware Association, June 6 and 7, 1919, in the William Penn Hotel, Pittsburgh, Pennsylvania. Efficient distribution is just as essential to the orderly processes of commerce as efficient production. The jobber performs a necessary function in this connection. He is entitled to a reasonable degree of cooperation on the part of the manufacturer and dealer. Certain recent developments in the metal trade indicate a deficiency in this respect which requires to be corrected. Therefore, in opening the first session of the meeting at 10 a. m. June 6, W. H. Donlevy, Chairman of the Metal Branch of the National Hardware Association called attention to the evils of destructive competition.

Friday, June 6, 1919.

After his brief opening remarks touching the purposes for which the eighth annual meeting of the Metal Branch of the National Hardware Association was convened, Chairman W. H. Donlevy delivered the report of the Metal Committee as follows:

Report of Metal Committee to the Eighth Annual Meeting of Metal Branch of the National Hardware Association of the United States, by the Chairman of the Branch, W. H. Donlevy, at William Penn Hotel, Pittsburgh, Pennsylvania, June 6, 1919.

"For the past two years, the business men of the country have been called upon to face a great number of unusually difficult situations.

"That they were resolutely met and surmounted is generally admitted.

"The experience thus gained should enable us successfully to solve the problems we now have, as a result of the tremendous changes that have occurred

in the country and in our industry since we met here a year ago.

"The cessation of price suggesting and price control by the Government again places the iron and steel industry on a competitive basis and permits the old law of supply and demand to become once more effective.

Mill Competition.

"Since the cessation of the war, direct competition from the manufacturers seems to have increased to a considerable degree.

"Some of the mills who have not heretofore indulged in the practice of selling to both wholesale distributors and also to their customers, have apparently changed their selling policy.

"The necessity and efficiency of wholesalers was demonstrated and acknowledged by the Government during the war. The wholesale distributor is the selling agent of the manufacturer and should be so considered and protected.

"If the wholesaler, by carrying well assorted stocks located in all parts of the country, is able to handle the business more economically than the mill, he should be allowed to do so and is justly entitled to a profit for the services rendered.

Destructive Competition.

"We have recently heard of destructive competition in several sections of the country by wholesalers. Such action is disastrous and no good reason can be assigned for it.

"A short time ago the Federal Trade Commission conducted an investigation into business conditions, reporting the numer of failures for the year under investigation.

"Chairman Hurley of the Commission reported that only 10 per cent of our manufacturers and merchants know the actual cost to manufacture and sell their products, that 40 per cent estimate what their costs were and 50 per cent have no method, but price their goods arbitrarily. He further states that more of the manufacturers and merchants who do not know what their goods cost, base their selling price on what their competitors sell for and by cutting prices demoralize the industry in which they are engaged.

"We command these statements to the careful consideration of those who are tempted to indulge in vicious competition.

Reduction of Grades and Sizes.

"During the war many industries effected substantial economies by reducing the number of sizes and grades. Unfortunately, no steps were taken in this direction in the commodities handled by metal distributors.

"In accordance with instructions given at our last meeting, we have communicated with the manufacturers of Terne Plates, suggesting the number of grades be reduced from eight to four. A report on this subject will be given at this meeting.

Overhead Expense.

"This is a subject that always demands our careful attention, but especially so at this time. It will be discussed at this meeting and it is hoped we will derive some information that will enable us to reduce it. The advent of motor trucks has resulted in distributors making free deliveries from their warehouses into their surrounding territory for many miles and we fear this expensive form of delivery has not always been considered in fixing selling prices.

"The prices named last year by the War Industries Board for warehouse shipments, were F. O. B. warehouse, and the cost of delivery was to be paid by the customers.

"It does not seem fair or equitable that the customer who calls with his team or truck at the warehouse, should be charged the same price as the customer who has his goods delivered to his shop.

"In several sections of the country, our members are collecting a regular charge for delivery and we believe it would be beneficial if this practice could be extended throughout this country.

Trade Acceptances.

"We are advised that an increased number of our members have adopted the practice of forwarding trade acceptances with their invoices. These members are enthusiastic over the results so far obtained and recommend the system to others.

Local Associations.

"We wish at this time to suggest to our members the great value of local and sectional associations.

"In several cities associations of this character have been organized and are doing work which has proven highly beneficial in improving local conditions surrounding the sale of the commodities we handle.

"Should there develop any questions or problems which you think should be brought to the attention of the National Association, your committee would be glad to give them all possible consideration.

"Since our first annual meeting eight years ago, the Metal Branch has steadily grown in membership and influence and today we have in our organization nearly all the manufacturers of Tin, Terne Plates and Blank and Galvanized Sheets, and with a few exceptions, all the distributors of these commodities. Since our last meeting, twenty-six houses have applied for membership in the Metal Branch, most of these joining in time to participate in the benefits arising as a result of the wonderfully efficient work emanating from the secretary's office during the war.

"Your chairman and secretary will be glad to hear from the members at any time on any subject that can be legitimately taken up for the benefit of the organization."

The remaining program of the first day's sessions included Roll Call by collection of cards, report of Entertainment Committee and discussions and addresses as follows:

"The Present and Prospective Price Situation," by the Honorable A. C. Miller, Federal Reserve Board. Washington, D. C.

"The Effect of the War in Increasing the Iron and Steel Production of the United States, Allied, and Enemy Countries," by A. J. Findley, New York City.

Discussion of the tin pig situation.

Address on "The Copper Market," by Greenville Mellen of Continuous Rolling Mills, Garwood, New Jersey.

Discussions of the galvanized sheet, the terne plate, and the coke plate situations.

Study of the question "Was Governmental Supervision of Iron and Steel Price Beneficial?" by Clifford E. Pierce of Betz-Pierce Company, Cleveland, Ohio.

An inquiry into the "Necessity for Continuing the Differentials for Warehouse Shipment that Prevailed during the War," by F. J. McNeive of W. F. Potts Son and Company, Incorporated, Philadelphia, Pennsylvania.

A reasoned answer by F. L. Greely of Herrick Company, Boston, Massachusetts, to the question: "Should the Mills Extend the Same Consideration to the Consumer who Purchases One Carload a Year as They Do to Wholesale Distributers Purchasing Twenty to One Hundred Carloads?"

Arguments by C. W. Henderson of Arthur C. Harvey Company, Boston, Massachusetts, and Fred L. Avery of Avery and Saul, also of Boston, in response to the query: "What Differentials Should Be Maintained for Less than Carload Shipments from the Mill When Sold to Small Buyers?"

"The Proper Method of Figuring Selling Prices" was the topic assigned to Harry L. Doten of Austin and Doten, Boston, Massachusetts.

The final subject on Friday's program was "The Service Performed by the Wholesale Distributer," by Richard J. Smith of Carter, Donlevy and Company, Philadelphia, Pennsylvania.

An informal dinner and smoker was given at 7 o'clock Friday evening at which two subjects were scheduled for treatment, namely, "Trade Extension," by James F. Conran of Standard Sanitary Manufacturing Company, Pittsburgh, Pennsylvania, and "Looking Backward," by Judge George P. Early of the American Sheet and Tin Plate Company, Pittsburgh, Pennsylvania.

Saturday, June 7, 1919.

The conspicuous part which S. H. Taylor of Merchant and Evans Company, Philadelphia, Pennsylvania, has taken in the campaign for establishing standards for tin roofing gave an authoritative tone to his treatment of the opening subject of Saturday morning's session, to-wit: "The Failure of the Underwriters Properly to Recognize the Superiority of Tin Roofing."

This was followed by a discussion of the necessity for counteracting the propaganda of the composition roofing manufacturers.

The "Advisability of Selling Roofing with a Guarantee" was explained by John Follansbee of Follansbee Brothers Company, Pittsburgh, Pennsylvania.

Ways and means of reducing overhead expenses were outlined by J. M. Townley of Townley Metal and Hardware Company, Kansas City, Missouri.

H. E. Nickerson of Congdon and Carpenter Company, Providence, Rhode Island, gave the results of his experienec upon the matter of "Increasing the Efficiency of the Average Salesman." A discussion of salesmen's problems then took place, dealing exclusively with questions and suggestions of salesmen connected with wholesale distributers. The meeting adjourned shortly after midday. General satisfaction was expressed with the benefits derived from the free exchange of ideas which characterized the assembly.

FOLLOWS EXCELLENT BUSINESS MOTTO.

The motto of the Berger Brothers Company of Philadelphia, Pennsylvania, is "Everything Must Be Right." The customer's welfare is always given first consideration and the Company at all times does its utmost to give efficient and prompt service. Its large stocks and up-to-date facilities enable it to serve the patrons' interests to the best advantage. The Berger Brothers Company manufactures and sells at wholesale a large and varied line of tinners' and roofers' supplies such as tin and terne plates; galvanized and black steel sheets; galvanized and painted roofing and siding; galvanized and copper cornices; skylights; ventilators; handles and ears; malleable and gray iron castings; stove pipe and stove pipe elbows; valves and plungers; gutter hangers; snow shoe irons; conductor hooks, etc. In the illustration herewith is the Wrought Star Ear for wash boilers made by this Company. This is perfectly even and in some sizes may be obtained in brass. Those who are interested should address the Berger Brothers Company, 229-231 Arch Street, Philadelphia, Pennsylvania, asking for the Company's latest catalog.

Wrought Star Ear, Made by Berger Brothers Company, Philadelphia, Pennsylvania.

NOTES AND QUERIES.

Thermometer.

From Bert J. Hawkins, Gibbons, Nebraska.

Kindly tell me who manufactures a thermometer registering five hundred degrees of heat.

Ans.—Brown Instrument Company, 111 Washington Street; Foxboro Company, 53 West Jackson Boulevard; and Taylor Instrument Companies, 29 East Madison Street; all of Chicago, Illinois.

Machine and Carriage Bolt Price List.

From the Stuttgart Hardware Company, Stuttgart, Arkansas.

Will you kindly let us know who can furnish us with a machine and carriage bolt price list?

Ans.—Bullard and Gormley Company, 175 North State Street, Chicago, Illinois, can send you this list.

Fire Escapes.

From King-Andrew Hardware Company, 304 East State Street, Rockford, Illinois.

Kindly let us know who in or near Chicago makes and installs fire escapes.

Ans.—Central Iron Works, Lake and Sangamon Streets; Hanke Iron and Wire Works, Albany and Chicago Avenues; F. P. Smith Wire and Iron Works, Clybourn and Fullerton Avenues; and Standard Fire Escape Company, 166 North May Street; all of Chicago.

Instruction on Repairing Radiators.

From Robert L. Stanley, Casselton, North Dakota.

Please tell me where I can get books on radiator repairing.

Ans.—You can secure these from the F. L. Curfman Manufacturing Company, Maryville, Missouri.

A man with horse sense never bets on one.

WEEKLY REPORT OF TRADE AND THE MARKETS

A QUICKENING OF BUSINESS IS THE MAIN FEATURE OF STEEL TRADE.

That a conviction is gaining headway as to the stability of prices is apparent in the steadily increasing business of the steel industry since the trade and builders have come to the conclusion that prices would not recede as low or as rapidly as they anticipated.

There is approximately as much price shading in finished steel products as formerly, few lines being entirely free from price irregularities, but the cutting does not spread, and March 21 prices are still regarded as representing the regular market. In this respect the market is stronger than was to have been expected, for earlier in the year producers felt that the only way to prevent the bottom dropping out of the market was for every producer to adhere rigidly to the recognized price schedule. Now the steel market is showing decided signs of being able to stand on its own merits.

Iron and steel exports in May amounted to 408,204 gross tons, the largest tonnage since last November, and comparing with the record of 656,053 tons in December, 1917. April exports of pipe, plates, and structural steel were particularly large.

Developments in the steel market during the past week centered around the general improvement in demand for all descriptions excepting the varieties for railroads. Demand from the latter quarter has been considerably below normal for some time past, but the trade is optimistic that this condition will not prevail much longer as orders placed by railroads so far have not nearly covered normal requirements.

There has been no change in prices, which are quoted on a basis of the schedule of March 21 which was approved by the Industrial Board. There is always a certain amount of shading in this market as both big and small concerns find it necessary at times to make certain concessions to big customers and also because of close competition on some contracts. However, this shading has not deviated much from the established price as the demand for structural steel of all kinds during the present month has risen above the producing rate. During the past month mills have been operating about 60 to 70 per cent for the smaller companies and 75 per cent for the large interests.

STEEL.

One noticeable factor in the market is the exceptionally strong demand for all descriptions of shapes, plates and bars for automobile companies. Near the end of the week it was reported that the General Motors Corporation had placed an order with the leading interest for 345,000 tons of steel. All other companies are specifying freely against contracts already placed.

COPPER.

The buying movement in copper that began early in May is still in evidence. Some large individual contracts were placed early last week and the aggregate bookings were heavy. The latter part of the week was less active but the market was not quiet. The large transactions resulted in an average of ½ cent to ⅝ cent per pound in carload lots on all grades and positions.

The market for Electrolytic is strong at 17⅜ cents to 17.50 cents for spot, June and July shipment and 17.50 cents for August shipment with the tendency of prices still upward. It is reported that sales of October, November and December were made at 17.75 cents to 18 cents for Electrolytic.

The bulk of business done was largely for July and August shipment and there is increasing interest in later positions. It is interesting to note that one large domestic consumer recently purchased 12,000,000 pounds for shipment up to September 1st.

It is estimated that total sales from May 1st, to date, have been close to 250,000,000 pounds, the transactions in May having been nearer 200,000,000 than 150,000,000 pounds previously reported.

The outlook on domestic account is especially encouraging and predictions are being made that 20 cents per pound for Electrolytic will be touched this fall.

It is understood that only the current output of the smelters is now being put through the refineries, surplus stocks of the metal being carried as blister rather than as refined copper.

The export trade is satisfactory as it could be under the circumstances, sales being somewhat in excess of foreign shipments from week to week.

There were shipments last week of over 1,000 tons to England on previous contracts and 1,500 tons to Gibraltar on which the final destination is unknown. The English market for refined copper is being kept below the American parity which will naturally discourage importations and afford an outlet at home for British Government stocks. Recently the c. i. f. price at London was no higher than the f. o. b. price at New York. France has taken a little more copper but mainly in the form of wire, shipments last week amounting to 178 tons. It is now reported that additional sales have been made to Japan.

According to recent Government returns imports in April were 14,500 tons exceeding exports during the same month by more than 4,300 tons. Exports in May, including shipments to Canada, were approximately 10,000 tons, and during the first five months of the year, total exports were in excess of 85,000 tons. Last week, exports amounted to 2,318 tons, including 275 tons that were shipped late in May.

TIN.

Excepting the publication of the tin statistics, which gave the Government holdings on June 1 at 1,600 pounds, the market for tin was devoid of any new features. The routine of business remained undisturbed and as long as the present restrictions are in force no change is expected. As consumption of tin is still below normal, the 1,600 tons will probably last for the present month and the trade is expecting to hear before July 1 in which way the granting of licenses for import will be handled. London deliveries during May amounted to 1,937 tons, and stocks on May 31 were given at 2,609 tons. Offerings of shipments from the Straits subject to license are in the market in the range from 50½ cents to 51 cents.

Sellers at present are not inclined to be very bullish on tin because of the continued indifference on the part of American consumer, and in consequence of this, although there are not cables, orders would undoubtedly be booked readily at the prices prevailing last week Friday, namely 50.50 cents to 50.75 cents for import Straits; 50 cents for import Banca; 49.75 cents for import English Lamb & Flag. A New York importing house received a cable on Chinese tin, one of the first for a long time, which showed that sellers there are out of touch with cost at present as the price quoted was over 54 cents per pound.

The feature is the extreme scarcity of spot tin of any kind as there seems to be nothing offering either from Government stock or from dealers for actual delivery in the East. The few orders being placed are for shipment from the Pittsburgh district or enroute from the West.

LEAD.

More cheerful reports are being received from the domestic consuming trade, chief among which deals with the notable improvement which has taken place in the lead cable industry. It is estimated that the cable makers are now using about 6,000 tons of lead a month or more than double their requirements in the early part of the year. Several firms which had munition contracts and which carried over large stocks have recently entered the market for the first time since the ending of the war, thereby indicating that their stocks are becoming exhausted. Increased demands are also being made by the plumbing industries, and in fact there has been an improvement in more or less every line.

The market is firm with hardly anything offering below the quotations of the leading interest of and 5.00 cents in carload lots, East St. Louis. Several producers are looking for a higher market in the near future.

SOLDER.

No changes have occurred in the solder market, prevailing prices in Chicago being as follows: Warranted, 50-50, per pound, 40.5 cents; Commercial, 45-55, per pound, 37.2 cents; Plumbers', per pound, 33.9 cents.

SPELTER.

There has been no decline in the strength of the spelter market. Prices, St. Louis basis, continue firm at 6.30 cents carload lots.

SHEETS.

The market is still irregular in character, as there is shading of prices by several mills, but the number of price cutters is not large and there is no evidence that the number has increased during the last week. The market is quotable generally at the March 21 wholesale prices, as follows: Black, 4.35 cents; galvanized, 5.70 cents; blue annealed, 3.55 cents. Sheet mill operations are averaging 65 to 70 per cent of capacity.

TIN PLATE.

Tin plate prices are universally reported as being strictly held, as to all regular business, namely, $7 per base box, Pittsburgt, for standard cokes. There are, of course, offerings of misfit stock plates at much below the regular market, the size of the cuts simply indicating how unfit the material, made up for war purposes of one description or another, is for regular uses.

OLD METALS.

Wholesale quotations in the Chicago district which may be considered nominal, are as follows: Old steel axles, $23.00 to $24.00; old iron axles, $27.00 to $28.00; steel springs, $16.00 to $17.50; No. 1 wrought iron, $15.50 to $16.00; No. 1 cast, $19.50 to $20.50, all net tons. Prices for non-ferrous metals are as follows, per pound: Light copper, 12 cents; light brass, 7½ cents; lead, 4 cents; zinc, 4½ cents; cast aluminum, 20 cents.

PIG IRON.

Pig iron prices have been sagging of late, declines being due to competition between pig iron producing districts more than to competition between furnaces. Both Southern Ohio and lake front furnaces, for instance, have been quoting for delivery in the Pittsburgh district, which is normally supplied by Valley and scattered Western Pennsylvania furnaces. The result has been lower prices than Valley furnaces would meet. At the same time these outside furnaces have endeavored to maintain prices for deliveries in their nearby territory, and the situation is correspondingly confused.

In the Chicago market strong confidence in conditions and prices is a notable feature. The steady increase of the use of coke by foundries points to larger melts of iron. While the bulk of inquiries is for 500 to 1,000 tons, some consumers are coming into the market for bigger quantities. Reports from Eastern markets show a healthy growth of the buying movement. Sales aggregate many thousands of tons—the total thus far being in excess of the entire buying movement during the month of May. Among the inquiries are several from agricultural implement manufacturers and heating equipment makers. From all quarters comes news of furnaces resuming operations. Indications are to the effect that the period of "watchful waiting" is drawing to a close.

Current Hardware and Metal Prices.

AMERICAN ARTISAN AND HARDWARE RECORD is the only publication containing Western Hardware and Metal prices corrected weekly.

METALS.

PIG IRON.

Basic	$29 65
Northern Fdy., No. 2	26 75
Southern Fdy., No. 2	33 00
Lake Sup. Charcoal	38 70
Malleable	27 25

FIRST QUALITY BRIGHT TIN PLATES.

			Per box
IC	14x20	112 sheets	$13 20
IX	14x20		14 63
IXX	14x20		16 30
IXXX	14x20		17 50
IXXXX	14x20		18 70
IC	20x28		26 40
IX	20x28		29 25
IXX	20x28		32 60
IXXX	20x28		35 00
IXXXX	20x28		37 40

COKE PLATES.

Cokes, 180 lbs		20x28	$16 00
Cokes, 200 lbs		20x28	16 20
Cokes, 214 lbs	IC	20x28	16 60
Cokes, 270 lbs	IX	20x28	18 50

BLUE ANNEALED SHEETS.

No. 10	per 100 lbs.	$4 57
No. 12	per 100 lbs.	4 62
No. 14	per 100 lbs.	4 67
No. 16	per 100 lbs.	4 77

ONE PASS COLD ROLLED BLACK.

No. 18-20	per 100 lbs.	$5 17
No. 22-24	per 100 lbs.	5 22
No. 26	per 100 lbs.	5 27
No. 27	per 100 lbs.	5 32
No. 28	per 100 lbs.	5 37
No. 29	per 100 lbs.	5 42

GALVANIZED.

No. 16	per 100 lbs.	$5 97
No. 18-20	per 100 lbs.	6 12
No. 22-24	per 100 lbs.	6 7
No. 26	per 100 lbs.	6 42
No. 27	per 100 lbs.	6 57
No. 2	per 100 lbs.	6 72
No. 30	per 100 lbs.	7 22

POLISHED SHEET STEEL.

No. 24	per 100 lbs.	$7 30
No. 26	per 100 lbs.	7 35
No. 27	per 100 lbs.	7 40
No. 28	per 100 lbs.	7 50

SMOOTH SHEET STEEL

			Per 100 lbs.
Wood's Smooth		No. 20	$6 57
"	"	No. 22-24	6 62
"	"	No. 25-26	6 67
"	"	No. 27	6 72
"	"	No. 28	6 87

PATENT PLANISHED SHEET IRON.

Patent Planished Sheet Iron, 100 lbs., base No. 28 ..... $11 55

BAR SOLDER.

Warranted, 50-50	per lb.	40.50
Commercial, 45-55	"	37.20
Plumbers'	"	33.90

SPELTER.

In slabs 7¼c

SHEET ZINC.

Casl lots 12c
Less than cask lots ..... 12½ to 12¾c

COPPER.

Copper Sheet, base 24c

LEAD.

American Pig	$5 65
Bar	6 15

Sheet.

Full coils	per 100 lbs.	$8 25
Cut coils	per 100 lbs.	8 50

TIN.

Pig tin 76½c
Bar tin 78½c

HARDWARE.

ADZES.

Carpenters'.
Plumbs ..... Net

Coopers'.
Barton's ..... Net
White's ..... Net

Railroad.
Plumbs ..... Net

AMMUNITION.

Peters Cartridges.
Semi-Smokeless ..... Less 10-7½%
Smokeless ..... Less 10-7½%

Shells, Loaded, Peters.
Loaded with Black Powder. Less 15%
Loaded with Smokeless Powder, medium grades ..... Less 15%
Loaded with Smokeless Powder, high grade ..... Less 15%

Winchester.
Smokeless Repeater Grade .. 10&5%
Smokeless Leader Grade .... 10&5%
Black Powder ..... 10&5%

U. M. C.
Nitro Club ..... 10&5%
Arrow ..... 10&5%
New Club ..... 10&5%

Gun Wads—per 1000.

Winchester	7-8 gauge	$2 25
"	9-10 gauge	1 94
"	11-28 gauge	1 63

Powder.		Each
DuPont's Sporting, kegs		$11 25
" "	½ kegs	5 90
" "	¼ kegs	3 10
DuPont's Canisters,	1-lb.	56
" "	½-lb.	32
" "	¼ lb.	22
" Smokeless,	drums	43 50
" "	kegs	22 00
" "	½ kegs	11 25
" "	¼-kegs	5 75
" "	canisters	1 00

L. & R. Orange, Extra Sporting kegs	11 25
L. & R. Orange, Extra Sporting ½-kegs	5 90
L. & R. Orange, Extra Sporting ¼-kegs	3 10
L. & R. Orange, Extra Sporting 1 lb. canisters	56
L. & R. Orange, Extra Sporting ½ lb. canisters	32
L. & R. Orange, Extra Sporting ¼-lb. canisters	22
Hercules "E.C." and "Infallible" 50 can drums	43 50
Hercules "E. C.," kegs	22 50
Hercules "E. C.," ½-kegs	11 25
Hercules "Infallible," 25 can drums	22 00
Hercules "Infallible," 10 can drums	9 00
Hercules "E. C.," ¼-kegs	5 75
Hercules "E.C." and "Infallible" canisters	1 00
Hercules W. A. .30 Cal. Rifle, canisters	1 25
Hercules Lightning Rifle, canisters	1 25
Hercules Sharpshooter Rifle, canisters	1 25
Hercules Unique Rifle, canisters	1 50
Hercules Bullseye Revolver, canisters	1 00

ANVILS.

Trenton, 70 to 80 lbs. ..... 9½c per lb.
Trenton, 81 to 150 lbs. ..... 9½c per lb.

ASBESTOS.

Board and Paper, up to 1/16" 17c per lb.
Thicker ..... 18c per lb.

Broad.

Plumbs, West, Pat		List
" Can. Pat		$69 00
" Firemen's (handled),	per doz.	21 00

Single Bitted (without handles).

	Prices
Warren Silver Steel	on application
Warren Blue Finished	"
Matchless Red Pole	$11 50

Double Bitted (without handles).

Warren's Natl. Blue, 3½ to 4½ lb. ..... Prices on application
The above prices on axes of 3 to 4 lbs. are the base prices.

BAGS, PAPER NAIL.

Pounds	10	16	20	25
Per 1,000	$5 00	6 50	7 50	9 00

BALANCES, SPRING.

Pelouze 20%

BARS, CROW.

Pinch or Wedge Point, per cwt. $8 50

BASKETS.

Clothes.

Small Willow	per doz.	15 00
Medium Willow	"	17 00
Large Willow	"	20 00

Galvanized Steel.	½ bu.	1 bu.	1½ bu.
Per doz.	$11 50	$17 00	$22 00

AUGERS

Boring Machine	60%
Irwin's	25%
Carpenter's Nut	50%

Hollow.

Bonney's	per doz.	30 00
Stearns, No. 0	"	43 25
" No. 1	"	43 25
" No. 2	"	43 25
" No. 3	"	42 00
" No. 4	"	9 00
" No. 30	"	45 00
" No. 33	"	45 00
" No. 44	"	17 00
" No. 50	"	48 00
" No. 55	"	45 00
" No. 60	"	39 00

Post Hole.
Iwan's Post Hole and Well 25%
Vaughan's, 4 to 9-in. .. per doz. $13 00

Ship.
Ford's, with or without screw, Net list

AWLS.

Brad.		
No. 3 Handled	per doz.	$0 65
No. 1050 Handled	"	1 40
Shouldered, assorted 1 to 4,	per gro.	4 00
Patent asst'd, 1 to 4	"	85

Harness.		
Common	"	1 05
Patent	"	1 00

Peg.		
Shouldered	"	1 60
Patented	"	75

Scratch.		
No. IS, socket hand'ld.	per doz.	2 50
No. 344 Goodell-Pratt, List, less		35-40%
No. 7 Stanley	"	2 25

AXES.

Boys' Handled.
Niagara 12 50

BEATERS.

Carpet.	Per doz.
No. 7 Tinned Spring Wire	$1 10
No. 8 Spring Wire coppered	1 50
No. 9 Preston	1 75

Egg.	Per doz.
No. 50 Imp. Dover	$1 10
No. 102 " " tinned	1 35
No. 150 " " hotel	2 10
No. 10 Heavy hotel tinned	2 10
No. 13 " " "	3 30
No. 15 " " "	3 60
No. 18 " " "	4 50

Hand.

	8	9	10	12
Per doz.	$11 50	13 00	14 75	18 00

Moulders'.
12-inch ..... Per doz. 20 00

BELLS.

Call.
3-inch Nickeled Rotary Bell, Bronzed base ..... per doz. $5 50

Cow.
Kentucky 30%

Door.	Per doz.
New Departure Automatic	$7 50

Rotary.

3 -in. Old Copper Bell	6 00
3 -in. Old Copper Bell, fancy	8 00
3 -in. Nickeled Steel Bell	6 00
3½-in. Nickeled Steel Bell	6 50

Hand.

Hand Bells, polished	15%
White Metal	15%
Nickel Plated	10%
Swiss	15%
Silver Chime	10%

Miscellaneous.
Church and School, steel alloys ... 30%
Farm, lbs. ... 40 50 75 100
Each $3 00 3 75 5 50 7 25

BEVELS, TEE.

Stanley's rosewood handle, new list ..... Nets
Stanley's iron handle ..... Nets

BINDING CLOTH.

Zinced 55%
Brass 40%
Brass, plated 60%

BITS.

Auger.

Jennings Pattern	20%
Ford Car	List plus 5%
Ford's Ship	" " "
Irwin	35%
Russell Jennings	15%
Clark's Expansive	33⅓%
Steer's " Small list, $22 00	5%
" " Large " $26 00	5%
Irwin Car	35%
Ford's Ship Auger pattern Car	List plus 5%

Center 10%

Countersink.

No. 18 Wheeler's		per doz.	$2 25
No. 20	"	"	3 00
American Snailhead		"	1 75
" Rose "		"	2 00
" Flat		"	1 40
Mahew's Flat		"	1 60
" Snail		"	1 90

Dowel.
Russell Jennings 15%

Gimlet.
Standard Double Cut. Doz. $1 10—$1 60
Countersink ..... Doz. 1 80

Reamer.

Standard Square	Doz.	2 50
American Octagon	"	2 50

Screw Driver.

No. 1 Common	"	1 40
No. 26 Stanley		1 75

BLACKING, STOVE. (See Polish)

BLADES, SAW.

Butchers'.
Standard, ¾ & 1¼-in.....Nets
Clock Spring..... "
Star..... "

Hack.
Atkins.....5%
Star.....Nets

Wood.
Disston

Nos.	6	66	26
	$8 00	$8 50	$8 00

Atkins

Nos.	2	14	18
	$3 85	$6 50	$4 75

BLOCKS.

Snatch.
Wooden.....Plus 10%

Tackle.
Iron Strapped.....Plus 10%

BOARDS.

Stove.
Wabash Crystal.....Net Prices
Wabash Oriental..... "
Wabash Mosaic..... "
Wabash Delft Enameled.. "
Wabash Art Inlay.....

Wash.
No. 760, Banner Globe, single) .....per doz. $5 25
No. 652, Banner Globe, (single) .....per doz. 6 75
No. 801, Brass King.. " 8 25
No. 860, Single—Plain Pump 6 25

BOBS, PLUMB.

No. 16, Stearns' Hexagon all steel.....per gross $50 00
No. 17, Stearns' Hexagon all steel..... 65 00

BOLTS.

Carriage, Machine, etc.
Carriage, ¾x6 and sizes smaller and shorter.....50-5%
Carriage, sizes larger and longer than ¾x6.....30-10%
Machine, ¾x4 and sizes smaller and shorter.....50-10-5%
Machine, sizes larger and longer than ¾x4.....40-5%
Stove.....75%
Tire.....60%

Mortise, Door.
Gem, iron..... 5%
Gem, bronze plated..... 5%

Barrel.
Cast.....Nets
Wrought..... "
Wrought, bronzed..... "

Flush.
Wrought..... "

Spring.
Wrought..... "
Wrought, heavy..... "

Square.
Wrought..... "

BORERS.

Angular.
Miller's Falls.....per doz. $23 00
Sill borers, No. 51... " 34 00
" " 52... " 39 50

Bung. Doz.
Enterprise Mfg. Co.'s No. 1....10%
" " " No. 2....10%

BOXES.

Mail, No..... 2 4 10
Per doz.....$18 00 23 00 29 00

Mitre.
Stanley's.....Net Prices
Stearns, No. 2.....per doz. $48 00

BRACES.

Fray's Genuine Spofford's..20&10%
" No. 08.....$7 50
" No. 010..... 8 00

BRACKETS.

Hay Rack.
Wenzelmann's No. 1, per doz. sets.....$18 00
Wenzelmann's No. 2, per doz. sets..... 19 20

Shelf.
Wrought Steel.....40%

Well.
Oak, Wrought Iron Riveted Top Ears.....per doz. $8 00

BURRS, RIVETING.

Copper Burrs only....25% above list
Tinners' Iron Burrs only.....30%

BUTTS.

Cast Iron.....7½%
Wrought Brass (New List).....Plus 5%
Wrought Steel, Bright.....40%
Wrought Steel, Japanned....Net prices

CALIPERS.

Double.....Nets
Inside and Outside..... "
Wing..... "

CALKS.

Logger's Boot.
(Lufkin R. Co.'s), per M.....$7 00
Toe.
Blunt and medium, 1 prong, per 100 lbs.....$6 00
Sharp, 1 prong, per 100 lbs.... 6 50

CANS.

Milk.
Elgin.

Gals.	5	8	10
Each	$4 00	$5 15	$5 15

Iowa Pattern.

Gals.	5	8	10
Each	$4 00	$5 15	$5 15

CAN OPENERS.

See Openers.

CAPS, GUN.

See Ammunition.

CARPET STRETCHERS.

See Stretchers.

CARRIERS.

Hay.
Diamond, Regular....each, Nets
Diamond, Sling..... " "

CARTRIDGES.

See Ammunition.

CASTERS.

Standard—Ball Bearing.....50&10%
Bed.....55%

Common Plate.
Brass Wheel.....15%
Iron and porcelain wheels, new list.....50%
Philadelphia Plate, new list....50%
Martin's.....40%

CATCHERS, GRASS.

No. 160S, per doz.....$12 25
No. 165S, " 14 01

CEMENT, FURNACE.

American Seal, 5 lb. cans, net $0 45
" " 10 lb. cans, " 90
" " 25 lbs cans, " 1 87
Pecora, 5 lb. cans..... " 45
" 10 lb. cans ..... " 90
" 25 lb. cans..... " 1 87

CHAIN AND CHAINS.

Breast Chains.
Doubleslack.....doz. pairs, $8 50
With Covert Snaps " 5 80
With Slide..... " 5 00
Without Slide.... " 4 60

Cable Coil Chains

Inch	¾	1	1¼
Per 100 lbs	7 75	7 50	7 50

Picture Chains.
Light Brass, 3 ft.....per doz. $1 25
Heavy Brass, 3 ft.... " 1 75

Safety Chain.
Brass..... 5%

Sash Chain. (*Morton's Steel*, per 100 ft.
0..... $2 50
2..... 3 10
1..... 3 60

Champion Metal.
0R..... 5 40
2R..... 5 60
1R..... 7 75

Champion Metal.–Extra Heavy.
1H..... 9 50

Cable Sash Chains.
Steel.....List Net Plus 15%

CHALK, CARPENTERS'

Blue.....per gro., $1 50
Red..... " 1 50
White..... " 1 45
Common White School Crayon..... " 25c

CHARCOAL.

In bags.....per bag $1.70

CHECKS, DOOR.

Blount.....Net list
Corbin.....

CHIMNEY TOPS.

Iwan's Volcano.....40%

CHISELS.

Box.

Inches	12	14
Round, per doz	$5 25	5 75
Flat, per doz	7 25	8 25

Cold.
Good quality, ¾ in. and larger.....per lb.
Smaller size, per doz.....Nets
Socket, Firmer.
Ohio.....Price on Application
Socket, Framing.
Ohio..... Price on Application
Tanged, Firmer.—Barton's.
With handles.....Net list
Choppers, See *Cutters, Meat.*

CHUCKS, DRILL.

Goodell's, for Goodell's Screw Drivers..... List less 35-40%
Yankee, for Yankee Screw Drivers..... 6 00

CHURNS.

Anti-Bent Wood,

Gal.	5	7	10
Each	$3 90	4 60	4 85

Belle, Barrel.....65&7½%
Common Dash,

Gal.	5	7
Per doz.	17 00	19 00

CLAMPS.

Adjustable
Martin's.....30%
No. 63, Screw...List price plus 25%
Cabinet.
Screw.....List price plus 25%
Carpenters'.
Steel Bar.....List price plus 10%
Carriage Makers'.
No. 61, Malleable Iron Screw, ...List price plus 25%
Quilt Frame.
No. 30 Ball and Socket, 2½" head.....per gross $8 75
No. 50, Ball and Socket, 3½" head..... per gross 10 25
Hose.
Sherman's, brass, ¾-in., per doz..48c
Double, brass, ¾-in., " 1 20

Saw Filers.
Wentworth's, No. 1, $12.50; No. 2, $18.25. No. 3, $16.25.

CLAWS, TACK.

Wood hdl. No. 10.....per doz. $0 95
Forged steel, wood hdle. " $1 75
Solid steel..... " 2 40
Giant..... " 50

CLEANERS.

Drain.
Iwan's Adjustable.....40%
Iwan's Stationary 30%
Pot.
Wire.....per doz. $0 75
Side-Walk.
Steel.....per doz., Net prices

CLEAVERS.

Family.

Beatty's, inch	7	8	9	10
Per doz.	$27 00	29 00	33 00	36 00

CLEVISES.

Malleable .....10c lb.

CLIPPERS.

Bolt..... $2 25&6 00

CLIPS.

Axle.....65&5%
Damper.
Standard.....per doz. 70c
Troy ..... " 38c
Hame ..... " 50c

CLOTH.

Emery.
Star .....New Prices
B. & A..... " "
Hardware Wire— Prices on application
Full rolls (100 ft.)
12 Mesh, galvanized.... "
14 " " .... "
16 " " .... "
18 " " .... "
Screen Wire. Prices on application.
12 mesh, painted, per 100 sq. ft... ....

COLLARS, STOVE PIPE.

Lacquered.

Inches	5	6	7
Fancy pattern, per doz.	80c	85c	$1 15

COMPASSES.

Carpenters'.....15%

COPPER—See Metals.

COPPERS—Soldering.

3 lb. and heavier.....per lb. 55c
2½ lb..... " 56c
2 lb..... " 57c
1½ lb..... " 58c
1 lb.....

CORD.

Picture.
White Wire.....70&10%
Sash.
Sampson Spot. No. 7. per doz. $21.15
Revenoc No. 7.....per doz. $14.40

CORKSCREWS.

Walker's.....30%
Williamson's Regular.....35&11%
Williamson's Forged Worm.....40%

COTTERS, SPRING.

All sizes (new list) 80%

COUPLINGS, HOSE.

Brass.....per doz. $2 25

COVERS, WAGON—See Tents.

CRADLES, GRAIN.

Morgan's Grapevine ..per doz. $45 00

CRAYONS—See Chalk.

CROWBARS.

Pinch or Wedge Point.....per lb. 8c

CUTTERS

Glass.
Woodward.....40%

Meat.
Enterprise—Nos. 5 10 12
Each $2 50 $4 25 $3 75
Nos. 22 32
" 6 50 8 50

Pipe.
Saunders', No. 1 2 3
Each.....$1 85 2 75 6 75

Slaw and Kraut. Per doz.
4-knife Kraut.....$20 00-55 00
3-knife Kraut, 8x27 in.. 13 00-18 00
1-knife Slaw..... 2 50
2-knife Slaw..... 3 00
Washer..... 11 00

DAMPERS, STOVE PIPE.

Ideal
3".....$1 00
4"..... 1 05
5"..... 1 15
6"..... 1 25
7"..... 2 20
8"..... 3 75
10"..... 6 00

DIES AND STOCKS.

Discount.....New List

DIGGERS.

Post Hole.
Eureka.....per doz. $14 50
Iwan's Split Handle (Eureka)
4-ft. Handle.....per doz.. 14 00
7-ft. " " " 20 00
Iwan's Perfection (Atlas) " 16 00
Iwan's Hercules pattern " 16 15
See also Augers—Post Hole.
Dividers, Wing..... 25%

DOOR CHECKS—See Checks.

DOORS, SCREEN.

3-in. 4-panel, painted.....Net Prices
3½-in. 4-panel, painted..... "
4½-in. 3-panel, natural pine, fancy..... "

DOOR HANGERS—See Hangers.

DRILLS.

Blacksmiths' Twist. (New List)....40%

Breast.
Millers Falls No. 12....Each, $46 00
" " " 112.... " 26 00

Hand.
Goodell's Automatic.
Nos. 01 03
Per doz. 12 00 14 40
Goodell's Single Gear, per doz. 15 75
Goodell-Pratt No. 4½ per doz. list, less.....35-40%
Goodell-Pratt No. 379 per doz. list, less.....35-40%

Reciprocating.
Goodell's.....per doz. 26 00

DRIVERS, SCREW.

Standard..... Nets
Lock Ferrule..... "
Champion..... "
Champion Pattern..... "
Clark's Interchangeable..... "
Edison..... "
Reed's Lightning..... "
Goodell's Spiral..... "
Yankee Ratchet..... "
" Spiral..... "

EAVES, TROUGH.

60% off Standard List.

ELBOWS—Stove Pipe.

1-piece Corrugated, Uniform.

	Doz.
5-inch	$1 40
6-inch	1 50
7-inch	1 90

Uniform, Color Adjustable.

	Doz.
5-inch	$1 35
6-inch	1 45
7-inch	1 80

ELBOWS—Conductor Pipe.

Galvanized Steel, Tin and Terne, Round Corrugated.

Size.	Doz.
2-inch	$ 3 60
3-inch	4 32
4-inch	7 20
5-inch	15 00
6-inch	18 00

Subject to 60% discount.

EMERY, TURKISH.

Size	5-lb pkgs.	½ kegs.	kegs.
Flour	15c	8c	7½c

EYES.

Bright Wire Screw—See Ooods, B. W.
Drifting Pick.....60, 10&5%

Hooks and Eyes—
Brass, 1½" No. 60..per gross, $3 50
Iron " " 50.. " 1 60

FASTENERS, STORM SASH.

Shroeder's.....per doz. $1 50
Sensible..... " 3 00

FILES AND RASPS.

Delta
Delta.....30%
Swiss.....List plus 25%
Utility..... " net.
Nicholson's—
American.....50&2½%
Arcade.....50&2½%
Black Diamond..... 40%
Eagle.....50&2½%
Great Western.....50&2½%
Kearney & Foot.....50&2½%
McClellan.....50&2½%
Nicholson..... 40%
J. Barton Smith.....50&2½%
X-F Swiss Pattern....List plus 10%

Simonds'.....50%
Disston's.....50&2½%
Heller's.....60&10%

FORKS.

Barley.
Steel, new list.....New Prices
Hay.
2-tine.....New prices
3- " .....New prices
4- " .....New prices
Digging.....New prices
Scoop.....New prices
Header.
3-tine.....New prices
4- " .....New prices
Manure.
4-tine.....New prices

FREEZERS—ICE CREAM.

White Mountain 1-quart....@
" " 2 " ....@
" " 4 " ....@
" " 6 " ....@
Arctic..... 1 " ....@
" ..... 2 " ....@
" ..... 4 " ....@
" ..... 6 " ....@
Prices on application

GAUGES.

Cream Pail.
Fairmount.....per doz. $3 75
Marking, Mortise, etc.....
.....Nets
Wire.
Disston's.....25%

GIMLETS.

Discount.....35@40%

GLUE.

Bulk.
B Amber.....per lb. 35c
A White..... " 40c
H. S. Amber..... " 32c
Liquid.
Army & Navy.....40%
Le Page's—
List "A".....37½%
List "B".....33½%
List "C".....25 %

GREASE, AXLE.

Wood Boxes.
Frazer's.....per gro. $13 00
Hub Lightning..... 7 50

Wood Pails.
Frazer's, 15lb.$1.00; 25 lb.$1.50 each
Hub Lightning, 15 lb. 90c; 25 lb. $1.21 each.

Tin Cans.
Frazer's
1½lb. per doz.....$1 75
3 lb. per doz..... 3 25

GRINDSTONES.

Family.

Inches..	7	8	10	12
Per doz..	20 50	21 75	26 25	30 50

Loose.
Per ton..... Price on application
Mounted.

Ball Bearing.....	1	2	3
Each.....	$4 75	5 00	5 25

GUN WADS.

(See Ammunition).

GUNS.

Iver Johnson Champion Single Barrel Shot Guns.....Net Prices
Double Barrel, Hammerless. "

HAFTS, AWL.

Brad.
Common.....per doz. $0 35
Peg.
Patent, plain top..... " 80
Patent, leather top... " 90
Sewing.
Common..... " 24
Patent..... " 55

HAMMERS, HANDLED.

per doz., net*
Blacksmiths, Hand, No. 0, 26 oz.$11 11
Engineers', No. 1, 26 oz..... 11 11
Farriers', No. 6, 7 oz..... 7 23
Machinists', No. 1, 7 oz..... 6 65

Nail.
Vanadium, No. 41½, 16 oz., per doz.....$12 00
V. & B., No. 11½, 16 oz. per doz. 10 00
Garden City, No. 101½, 16 oz., per doz..... 9 00
Tinner's Riveting, No. 1, 8 oz., per doz..... 8 00
Shoe, Steel, No. 1, 13 oz. per doz. 6 88

Tack.
Magnetic.
Per doz..... $5 63

HAMMERS, HEAVY.

Heavy Hammers and Sledges.
Under 5 lbs.....50%
5 lbs. and over.....50&10%
Masons'.
Single and Double Face.....50%

HANDLES.

Auger.
Common Assorted....per doz. $0 75
Pratt's Adjustable, Nos. 1 & 2, per doz..... 6 00
Ives' Adjustable.....per set, 1 35
Axe.....30%

Chisel.
Hickory, Tanged, Firmer, Assorted, 55c; Large, 85c per doz.
Hickory, Socket Firmer, Assorted, 70c; Large size, 80c per doz.
Coal Pick.....40%
Drifting Pick.....40%
File, assorted, 30c; Large, 35c per doz.

Hammer.
Adze Eye.....per doz. 40 to $1 00
Blacksmiths'.... " 45c@1 00
Machinists'.... " 50c@1 00
Hay and Manure Fork.....25%

Screw Driver.
Assorted..... " 60
Large..... " 90
Shovel and Spade.....25%

HANGERS.

Barn Door.
U. S. Rolled Bearing.....12½%
Matchless.....12½%
Warehouse Tandem, No. 44...33½%
Conductor P.
Iwan's Perfection.....50%
Eave Trough.
All sizes 5" or smaller, ...per gross. $3 80 Net
All sizes, larger than 5", ...per gross. 5 00 "
Garage Door.
Right Angle.....50&10%
Sliding Folding.....50%
Receding.....50%
Parlor Door.
Acme.....per set, $3 75
Ives' Improved..... " 3 40
Lane's Standard..... " 3 50
Lane's New Model... " 3 10
Le Roy Noiseless.....40&10%
Richards.....25%
Advance.....40&10%

HASPS.

Hinge, Wrought..... Add 50% to list.
With Staples—See Staples.

HATCHETS.

Crescent.....50%
Cast Claw.....per doz. $1 50@1 85
Cast Shingling... " 1 50@1 85
Germantown.....7½%

HAY KNIVES.

See Knives.

HAY RACK BRACKETS

Wenzleman's No.1 per doz. sets, $18 00
Wenzleman's No. 2 " " 19 20

HINGES.

Blind.
Clark's Gravity

No. 1.....per doz. sets,	$2 25
No. 3..... " " "	5 75

Gate.

Clark's.....	1	2	3
Hgs & Ltch, doz.	$5 50	7 00	9 75
Hinges only "	4 75	5 50	8 00
Latches only.	1 90	1 90	....

Screen Door.
Cast Iron.....gross $10 00
Steel..... " 7 00

Spring.
Chicago.....Add 12½% to list.
Columbia Dbl. Acting...40&10&5%
Gem.....25%
Ideal Detachable...per gro. $11 00
Matchless.....40%
New Idea.....per gro. $7 20
Oxford.....20%

Wrought Iron.
New Lists.....
Light Strap Hinges.....15%
Heavy Strap Hinges.....25&5%
Light T Hinges.....15&5%
Heavy T Hinges.....20&5%
Extra Heavy T Hinges.....25%

Screw Hook and Strap.
6 to 12 in.....per 100 lbs. $7 75
14 to 20 in..... " " 7 50
22 to 36 in..... " " 7 25

Screw Hook and Eye.
¾ in.....per doz. pair $2 60
1 in..... " " 3 50
1½ in..... " " 5 00

HOES.

Garden .....Net

Grub.
Extra.....New prices
Hazel.....per doz. New prices
Ladies' and Boys'.....New prices
Mortar.....New prices
Planter's Eye.....New prices
Weed.....New prices

HOLLOW WARE—See Ware.

HOOKS.

Awning. No. 60.....per gro. 50%

Belt.
Brown's.....70&5%
Jones'.....65&5%

Bench.
See Stops, Bench.

Box.

Inch	5	7	10	12
Per doz	$2 50	2 75	3 25	3 85

Bush.
Common Axe Handle, per doz. $22 00

Chain.

Inch	¼&⅜	½	⅝	¾
Pr 100	$7 60–8	10	9 75	11 50	12 60

Clothes Line.
Japanned.....per doz. 48c @1 40
Galvanized..... " 75c@2 50

Coat and Hat.
Common Wire....per gro. 1 25-1 65

Conductor.
Iwan's Tinned Sickle.....10%

Corn.
Common, riveted, painted red.....per doz. Nets
Little Giant..... " "

Gate.
See Goods, Bright Wire.

Grass.

Common Nos.	1	3	5	7
Per doz	$4 50	3 50	3 75	3 25

Hammock.
With plate.....per doz. 1 10
With screw..... " 1 00

Lambrequin, or Drapery. per gro...30c
Picture.....50%@50&10%
Potato and Manure.....Nets
Screw.
Brass.....70%
(See Goods, Bright Wire.)
Seat Spring.....per lb. 5½c

HOSE, GARDEN.

		Coupled, per ft.
Velvet,	3 ply-¾" guar. press.	14c
Eclipse	" " "	17½c
Diamond	" " "	21c

COTTON COV. RUBBER HOSE.

High Grade Apache 1" guar. press.
400 lbs.....40c

HUSKERS.

Boss.

Nos	B	E
Per doz	New Nets	
No. 59	per doz.	New Nets

IRON, PIG.

See Metals.—First column.

IRONS.

Curling.
C.....per doz. $4 40
B..... " 50
A..... " 58
Princess..... " 1 25
Thelma..... " 1 25
Pinking..... " 1 00

Plane.
Wood Bench.....Add 10% to list

Sad.
Charcoal.....per doz. $11 00
Common, polished, per 100 lbs. 7 75
No. 70 Asbestos.....$1 50 net
No. 100 " ..... 1 75 net
Common, nickel plated..... 8 25
Mrs. Pott's,
No. 50 J, Enterprise, per set, Nets
No. 55 J, " " "
No. 50 T, " " "
No. 55 T, " " "
Tailors' Sad.....per lb "
Tailors' Goose..... " "

Ideal.
6 lb. Household.....$3 50
9 lb. Dressmakers'..... 4 25
14 lb. Tailors' Goose..... 5 50

Tuyere.
Single Duck Nest....per doz. $5 25
Double Duck Nest... " 6 25
Sutton.....each 2 60

JACKS.

Locomotive.....30&10%
Wagon.
Richard's No. 1.....per doz. $15 50
Miller..... 20 00
Oliver,

Nos	0	00
Each	$0 60	$0 80
Standard, Nos	1	2
Each	$0 60	1 00

R-W
Big Lift.....40%
Tiger.....40%

KETTLES.

Brass.....15%
Cauldron.....40&5%
Copper.....per lb. 27
Maslin.....40&10%
Sugar.....50%

KNIVES.

Beet Topping.
Clyde, 9-in. Scimiter Blade, dz. $3 85
California..... 3 40
Butcher. Per doz.
Handles, 6" blade.....$3 25
" 7" " 3 75
Beechwood handles, 9" blade.. 4 50
" " 10" " 5 25
Cooper's Hoop.....15%
Corn.
Clipper.....per doz. $1 75
Disston's..... " 2 75
Earle's..... " 3 00
Woodford..... " 2 25
Drawing.
Standard.....(New List)...15%
Adjustable.....15%
Barton's Carpenters'.....15%
Hay.
Iwan's Solid Socket.....doz. $13 00
Heath's..... " 13 00
Iwan's, Sickle Edge..... " 15 50
Iwan's, Impv'd Serrated. " 15 75
Hedge.
Challenge.....per doz. $6 00
Disston's..... " 3 75
Mincing.
Common, Single..... " 60
Common, Double.... " 90
Streeter, 4-blade..... " 1 30
Streeter, 6-blade..... " 2 00
Putty.
Common.....per doz. $0 75@1 50
Lander's..... " 1 75@2 50
Scraping.
Beech Handle..... 90@1 10
Lander's..... 5 50@6 50

KNOBS.

Doors.
Mineral.....per doz. $2 10
Porcelain..... " 2 20
Jet..... " 2 20

LADDERS.

Common Long.
Per ft.....17c@23c
Extension.
Per ft..... 22 to 28
Step.
Common, per ft.....23c
Common, with Shelf, add 10c.
IXL.....34c
Challenge, 6 to 9 ft.....55c
10 to 16 ft.....60c

LANTERNS.

Bull's Eye Police.
3-in. Flash Light...per doz. $13 00

LEADERS, CATTLE.

Nos	51	52
Per doz	$1 35	1 45

LEATHER, LACE.

Cut.....50%
Sides.
Ex. Quality.....per sq. ft. $0 45

LEATHERS, PUMP.

Valve and Plunger.....10%

LIFTERS.

Stove Cover.
Coppered.....per gro. $3 25@5 50
Alaska..... " 8 00
Alaska..... " 10 00
Transom.
Payson's.....55%

LINES.

Chalk.
Twisted in 20-ft. hanks.

Nos.	4	6	7	8	9
Gro	Prices on Application				

Twisted in 50-ft. balls.

Nos	1	2	3	4
Per doz	Prices on Application			

Braided in 20-ft. hanks.

Nos	0	1	2	3
Per doz	Prices on Application			

Mason's..... " " "
Clothes.
60 ft. Jute.....per doz. $0 95
60-ft. Sisal..... " 40
50-ft. Cotton..... " 15
50-ft. Braided Cotton " 25

LINING, STOVE.

Bricks.....per crate, 42c

LOCKS.

Barn Door.
No. 60 Stearns.....per doz. $9 00
No. 80 " ..... " 17 50

MACHINES.

Boring.	Without Augers	With Augers
Angular...per doz.	$3 00	4 40
Upright... "	2 60	4 00

Riveting.
Stearns No. 1.....per doz. $12 00
Tenoning.
No. 50 Peace's Spoke...each $10 75

MAIL BOXES.

See Boxes.

MALLETS.

Carpenters'.
Fibre Head, No. 2, per doz. $16 50
" No. 3 " 19 50
" No. 4 " 28 50
Round Hickory..... " $3 00– 5 00
" Lignumvitæ.. " 6 25–10 50
Square Hickory..... " 3 50–5 50
" Lignumvitæ.. " 8 00–12 00
Tinners'.
Hickory..... " 2 25

MATS.

Door.
National Rigid.....50&10&5%
Acme Steel Flexible.....50%
Stove.
No. 2.....per gro. Nets
No. 1..... " "
No. 1 Asbestos Toasters, or wire-covered Stove Mats, with handle.....per doz. 1 10
No. 2 Asbestos Toasters, with ring..... per doz .. 60

MATTOCKS.

Plumbs.....25%

MAULS.

Iron, lbs	10	13	16	18
Per doz	Prices on Application			
Wood Face, lbs	10	12	14	
Per doz	Prices on Application			

Wood Choppers'.
Lake Super'r & Oregon Pat. 40&5%

MEASURES.

Galvanized, doz.....Nets
Japanned, doz.....Nets

MILLS, COFFEE.

Enterprise.....16⅔%
Parker.....50&5%
Arcade.....40-10%

MITRE BOXES.

See Boxes.

MOPS.

Cotton. Star (Cut Ends).

Pounds	12'	15'	18'	24'-3 oz.
Per doz.	$4 50	5 65	6 75	9 00

MOWERS, LAWN.

Gladiator—B. B.

Inches	16	18	20
Each	$6 50	7 25	8 00

King Universal—B. B.

Each	$5 25	5 75	6 00
Inches	14	16	18
Big Giant	$3 50	3 90	4 25

Stearns'.

No. 1—12 in.	each	$6 75
14 in.	"	7 00
16 in.	"	7 25
18 in.	"	7 50
No. 2—10 in.	"	7 75
12 in.	"	8 25
14 in.	"	8 75
16 in.	"	9 25
18 in.	"	10 00
20 in.	"	10 75
No. 3—10 in.	"	8 00
12 in.	"	8 50
14 in.	"	9 00
16 in.	"	9 50
18 in.	"	10 25
20 in.	"	11 20

NAILS.

Cut Steel.....Prices on Application
Cut Iron..... " " "
Wire.
Small Lots....Prices on Application
Cement Coated.
Small Lots....Prices on Application
Horseshoe.
Ausable.....55&5%
Capewell.....15%
Perfect.....55&5%
Putnam.....20&5%
Star.....30&5%
Picture.
Brass Heads 25%
Brads.....50&5%
Furniture.....List plus 15%

NAIL PULLERS.

See Pullers.

NAIL SETS.

See Sets.

NETTING, POULTRY.

Galvanized before weaving,...40&10%
Galvanized after weaving.....40%

NIPPERS.

End Cutting.

Stubb's Pattern, Inches.	5	6
Per dozen	$4 65	6 75

End and Diagonal Cutting.

Swedish Side. Inches..	5	6
Per dozen	$4 50	5 75

Hoof.
Heller's.....40&10%
V. & B.....55&5%

NOZZLES.

Hose.
Magic.....per doz. $9 50
Diamond..... " 5 75

NUTS, HOT PRESSED.

Square Tapped.
$1.05 off per 100 lbs.
Hexagon Tapped.
85c off per 100 lbs.

OILERS

Chase Pattern.
Brass and Copper.....25-10%
Zinc.....35%
Engineers'.
Tin.....per doz. $7 00@ 9 00
Machine.
Common.....per doz. $0 85

OPENERS.

Box.
See Box Chisels
Can.
Delmonico.....per doz. $1 30
Never Slip..... " 65
Crate.
V. & B..... " 7 25-11 00

Stove.

	Per 100 Joints
29-Gauge, 3-inch	$15 50
" 4-inch	16 50
" 5-inch	17 70
" 6-inch	18 75
" 7-inch	21 20

T-Joint, Made-up.
6-inch.....per 100 $31 00
Furnace Pipe.
Double Wall Pipe and Fittings 33⅓%
Single Wall Pipe, Round Pipe Fittings.....33⅓%
Galvan'd and Black Iron Pipe, Shoes, etc.....30%

PLANES.

Stanley Iron Bench.....net

PLATES, TIN.

See Metals in Column 1.

PLIERS.

Giant, Button's—Nets
Cutting.
Bernard's.....New Prices
Lodi.....New Prices
Paragon.....New Prices
Fencing.
Black Bull.....All Nets
Farmers' Choice.....All Nets
Russell's.....All Nets
Flat and Round Nose.
Bernard's.....New Prices
Lodi.....New Prices
Paragon.....New Prices

Gas.—Inches 7 8 10 12 14
Per doz. 5 00 5 50 7 00 8 00 10 00

PARERS.

Apple.

Goodell's	per doz.	$10 80
Turntable	"	11 40
White Mountain	"	8 40
Reading, No. 78	"	11 40

Potato.

Goodsell's Saratoga, 10½ in.,	dz. 6 50
Goodsell's Saratoga, 5 in.,	dz. 5 50

PICKS.

Adze Eye Ore	22½%
Drifting and Poll Picks	22½%
Plumbs, Railroad	22½%
Surface	22½%

PINCERS.

Carpenters', cast steel.

Inches	6	8	10	12
Per doz	$3 75	4 75	6 25	7 00

Blacksmiths'	45%
Heller's	40%

PINS.

Clothes.

Common....per box of 5 gro. $0 95

Picket

Fluted, 15-in.	per doz.	$1 10
Fluted, 21-in.	"	1 60
Spiral	"	1 90

PIPE.

Conductor.

Standard Gauge Conductor Pipe, plain or corrugated.

Not Nested	45&5% off
Nested solid	50% off

L. C. L. to Dealers:—
Terms 60 days; 2% Cash 10 days.

Factory shipments generally delivered.

OUTFITS, COBBLING

Combination	per doz.	$16 00
Economy	"	8 50
Family	"	14 50

PAILS.

Cream.

14-qt., without gauge,	per doz.	$9 50
18-qt., " "	"	11 00
20-qt., " "	"	11 75

Sap.

10-qt., IC Tin	per doz.	$4 00
12 " "	"	5 50

Stock.

Galv'd. qts.	14	16	18	20
Per doz	$9 75	10 75	12 75	14 50

Water.

Galvanized, qts.	10	12	14
Per doz	$5 75	6 50	7 25

Wood.

Cable, 2-Hoop	per doz.	Nets
Cable, 3-Hoop	"	Nets
Cedar, 3-Hoop, brass	"	Nets

PANS.

Dripping	Net

Fry.

Common	Nets
Acme	"

Roasting.

Paxton, Nos	1	2	3	4
Per doz				Nets
Neverburn				"

Savory No. 200.....per doz. $8 40

PAPER.

Building.

Plain	per 100 lbs.	Prices on application
Tarred	"	
Tarred Felt	"	
Red Rosin, 20-lb.	per roll	72c
Red Rosin, 25-lb.	"	90c
Red Rosin, 30-lb.	"	$1 08

Sand and Emery.

No. 1, per ream, best grade	$5 40
No. 1, per ream, cheaper grade	4 85

Wrapping.

Express	100 lbs.	Nets

Tinners'.

Hollow	Net list
Solid	each, 10c

PLUMBS AND LEVELS.

Common	Nets
Cook's	40%
Davis' Iron	25%
Davis' Inclinometer	15%

POINTERS, SPOKE.

Stearns' No. 1	per doz.	$7 25
" No. 2	"	9 25

POKERS, STOVE.

Wr't Steel, str't or bent	per doz.	$0 75
Nickel Plated, coil hanl's	"	1 10

POLISH.

Burneshine.

¼-pint	doz.	$1 10
½-pint	"	1 50
1-pint	"	2 60
1-quart	"	5 00
½-gal	"	9 00
1-gal	"	15 00

Metal.

Wizard, 6 oz.	per gross		$17 40
" ½ pt.	"	"	19 20
" 1 pt.	"	"	36 00
" 1 qt.	"	doz.	5 40
" ½ gal.	"	"	9 60
" 1 gal.	"	"	15 60

Stove.

Black Eagle Paste, 1-lb. cans, per gross	$30 00
Black Eagle Paste, 5-lb. cans, per case	4 90
Black Jack Paste, #10, 8 oz., per gross	11 40
Black Eagle Liquid, 6 oz., per gross	13 20

FIRE POTS.

Clayton & Lambert's, each		$4 00@6 00
Gate City	each,	6 25
Gem	each,	$6 75@8 50

POWDER.

See Ammunition.

PRESSES, FRUIT AND JELLY.

Enterprise Manufacturing Co....25%

PRIMERS.

See Amunition.

PRUNERS.

Disston's Pole	per doz.	$18 00
Water's Improved		60%

PULLERS.

Cork.

Daisy	each,	$3 10
Phœnix	"	1 40
Quick and Easy	"	2 70

Nail.

Giant	per doz.	14 50
Never-Slip	"	17 00

PULLEYS.

Awning—Jap'd	10%
Clothes Line	10%

Hay Fork.

Iron Wheel, 5-in.	per doz.	2 50
Wood Wheel, 6-in.	"	2 65
Wood Wheel, 6-in., pass knot	per doz.	3 00

Sash.

Common	Net
Common-Sense, 2-in.	Net
Empire Pattern, 2-in.	Net
Ideal	Net
Steel	Net

PUMPS.

Pitcher Spout.

Nos.	1	2	3	4
Each				Nets

Spray.

Midget Junior	per doz.	3 75
New Misty	"	6 00
Crescent	"	6 50

PUNCHES.

Conductors.

No. 22	per doz.	$3 00
Machine	per lb.	25

Saddlers'.

Common.....per doz. 1 50 to 5 00

Revolving Spring.

Stearns, No. 10	per doz.	$4 80
" No. 40	"	9 50
" No. 60	"	12 80

PUTTY.

Strictly pure.....per 100 lbs. $4 25

RAIL.

Barn Door.

Matchless, 1-in.	5c
Matchless, 1½-in.	7c
Storm King	5c

Sliding Door.

Bronzed wrought iron...per ft. 8½c

RAKES.

	Per doz.
Garden.	
Steel, Bow, 12-inch Teeth	$8 50
Steel, Bow, 14-inch "	9 25
Malleable Iron, 12-in. "	4 75
Malleable Iron, 14-in. "	5 00

Hay.

Wood, 10 Teeth $4 00

Lawn.

20 Teeth .....per doz. $5 50

RASPS—See Files.

RAZORS—SAFETY.

Gillette	per doz.	$45 00
Auto Strop	"	45 00
Gem	"	8 40
Gem (3 doz. lots)	"	8 00
Ever Ready	"	8 40
Ever Ready (3 doz. lots)	"	8 00

RAZOR STROPS.

Star (Honing).....50%

REGISTERS.

Japanned, Bronzed & Plated.....40%
Solid Brass or Bronze Metal..Net list plus.....Prices on application
Baseboard.....40%

REGISTER FACES.

Japanned, Bronzed and Plated.
4x6 to 14x14.....40%
14x14 to 38x42.....60%

REVOLVERS.

Iver Johnson Safety Automatic Hammer	New Nets
Hammerless	"
I. J. Model 1900	"

RINGS AND RINGERS.

Bull.

Copper	2½-in.	3-in.
Per doz	$2 75	$3 25
Rea's Improved Self-Piercing copper, doz.	3 40	
Steel, per doz	1 50	1 80

Hog.

Blair's Rings	per doz.	$ 75
Blair's Ringers	"	1 00
Brown's Rings	"	72
Brown's Ringers	"	1 00
Hill's Ringers	"	1 00
Hill's Ring, boxes	"	72
Major Rings	"	60
Perfect Ringers	"	1 50
Wolverine Rings	"	1 65
Wolverine Ringers	"	1 10

Fruit Jar.

White.....per lb.....30c

Key.

Split, round	per doz.	$0 17
Split, square	"	32
Ball, round	"	40

RIVETS.

Copper Belt	Add 15% to list
Coppered Iron	30%
Tinners'	30%
Hame	per lb. $0 17
Slotted Clinch	per doz. 60c@1 10

Tubular.

Nos. 1 and 2 assorted sizes, 50 in box	doz. 75c
Nos. 1 and 2 assorted sizes, 10 in box	doz. 1 40

RIVET SETS.

See Sets.

ROPE.

Cotton.

¼, 5-16 in. Com. on reels	per lb. Market
¼, 5-16 in. Com. in coils.	" Price

Sisal.

1st Quality	23½c
No. 2	20½c

Pure Manila.

1st quality, base	per lb.	27½c
Hardware Grade	"	26½c

RULES.

Hickory Board	20%
Log	20%

SAWS.

Band.
E. C. Atkins & Co. Prices on applic'n

Buck.
Disston's ..... New nets
Jackson's ..... New nets

Butchers'.
E. C. Atkins & Co. Prices on applic'n
Disston's ..... New nets

Circular.
E. C. Atkins & Co. Prices on applic'n
Disston's ..... New nets
Hiles' ..... New nets
Simonds' ..... New nets

Compass.
E. C. Atkins & Co. Prices on applic'n
Common ..... New nets
Disston's ..... New nets

Cross-Cut.
E. C. Atkins & Co. Prices on applic'n
Disston's ..... New nets
Simonds' ..... New nets

Dehorning.
Disston's ..... New nets

Hack.
Disston's ..... New nets
Simonds', Box Lots ..... New nets
Star ..... New nets

Hand and Rip.
E. C. Atkins & Co. Prices on applic'n
Disston's No. 7 ..... New nets
Disston's Nos. 8, D8, 12, 76, 112, D100, and 120 ..... New nets
Keystone ..... New nets

Keyhole.
Disston's ..... New nets

Miter Box.
E. C. Atkins & Co. Prices on applic'n

Narrow Band.
Simonds' ..... New nets

Panel.
E. C. Atkins & Co. Prices on applic'n
Disston's No. 7 ..... New nets

Pruning.
Disston's ..... New nets

Rift.
Simonds' ..... New nets

Wood.
E. C. Atkins & Co. Prices on applic'n
Common ..... New nets
Clover leaf ..... New nets

SAW BUCKS—See Bucks.

SAW SETS—See Sets

SAW TOOLS—See Tools.

SAW FRAMES.

Common, plain	per doz.	$1 50
Common painted	"	2 10

SCALES.

Counter.	
Pelouze	40&10%

SCISSORS.

Star	60%

SCOOPS.

Grain.

½ bu. "Hercules"	per doz.	3 70
1-bu. "Hercules"	"	5 00

SCRAPERS.

Box.		
Triangular, No. 6	per doz.	$6 25
Cabinet		
Stearns' No. 8	per doz.	$10 00
" No. 9, Ball and Socket	per doz.	11 25
Floor.		
No. 10, Stearns'	each	$13 50
Road.		
Cubic ft	7	5 3
With runners, ea.	$7 00	6 50 6 20

SCREEN DOOR HINGES.

Cast iron	gross,	$13 00
Steel	"	9 50

SCREWS.

Bench.

Iron, ins.	1	1½	1¾	1¾
	$9 75	11 50	13 75	21 50

Wood, white maple	per doz.	6 00
Hand—Wood		35%
Hand Rail		22½%
Jack		30-5%
Lag or Coach—all sizes, gimlet pointed		50-10%

Saw—Centennial,

Nos.	1	2	3	4
Per doz	47c	55c	75c	90c

Wood

F. H. Bright	70-10-10%
R. H. Blued	65-10-10%
F. H. Jap'd	62½-10%
F. H. Brass	42½-10-5%
R. H. Brass	40-10-5%
R. H. Nickel Plated	57½-10%

SCYTHES.

Clipper, grass	per doz.	$13 50
Honest Dutchman	"	13 70

SETS.

Nail.
Square head..... per doz. $1 25
Cup point, knurled.. " 1 15
Rivet.
Farmers'.....per doz. $2 10
Tinners'.....25%
Saw.
Aiken's Pattern.....per doz. $6 50
Disston's Monarch... " 7 20
Disston's X-Cut..... " 13 50
Leach's..... " 80
Nash's Hand..... " 3 15
Nash's X-Cut..... " 4 20
Stillman's Lever..... " 1 30
Stillman's X-Cut..... " 2 50
Stearns H'nd, No. 100 " 7 50
" X-cut, No. 103 " 17 50
" " No. 104 " 17 50
Whiting Pattern, No. 21 " 5 75
Eccentric Anvil, Hand, No. 395, N. P. Morrill Pattern, ...per doz. 11 50
Stearns Hand, No. 105, N. P. Morrill Pattern...per doz. 10 00

SHARPENERS, SKATE.

Diamond.....per doz. $1 60
Perfect..... 1 20

SHAVES, SPOKE.

Stearns' No. 1.....per doz. $2 00
" No. 2..... " 4 00
" Nos. 3, 4, 5, 6.. " 3 50
" Nos. 7, 8..... " 4 50
" No. 9..... " 3 00

SHEARS.

Pruning.
Buckeye, No. 1.....per doz. $5 75
Buckeye, No. 2..... " 7 40
California Pat., 9-in.. " 3 20
California Pat., 10-in. " 4 00
Draw Cut, No. 3..... " 13 75
Draw Cut, No. 4..... " 16 50
Henry's Pat 0 01 14 012
Per doz...$1 40 2 10 2 90 2 80
Star.....per doz. $4 00
Sheep—No. BBA,
Inches..... 6 6½ 7
Reg. Grip.....$11 25 11 50 12 00
Nar. Grip., doz. 11 00 11 25 12 25
Star.....60%
Tinners'—See Snips.

SHEAVES, SLIDING DOOR.

Common.
Inches.... 3 4 5
Per set..... $1 40 1 75 2 40
Hatfield's.
Per set...$1 80 2 10 2 75 4 25

SHELLS—See Ammunition.

SHELLERS, CORN.

Union.....per doz. $6 75

SHIELDS.

Expansion Bolt Shields.....60%

SHOES.

Conductor.....60%

SHOT—See Ammunition.

SHOVELS AND SPADES.

Coal.
No. 2, Woodford.....per doz. $5 50
No. 182..... " 6 00
Ames', new list.....Discount, 12½%
Per doz.
Neverbreak, hollow bck, blk....Nets
National... " " ... "
Buckeye... " " ... "
Mohawk... " " ... "
Bar Drain & Ditching
Iwan's Perfection... .....$30 00
Railroad, etc.
Black Diamond.....per doz. Net
Crescent..... " "
Keystone..... " "
Star..... " "
Hollow Back..... " "
Ames', new list.....Discount, 12½%
Snow.
Galvanized, with wood handle, No. 56.....$1 45
No. 55..... 1 55
Alaska Steel.
D-Handle.....per doz. $3 50
Long Handle..... " 3 00

SINKS.

Cast Iron.
Painted, 16x24..... Net
Enameled, White, 16x24..... "
Wrought Steel.
Painted, 16x24..... "

SLEDGES—See Hammers.

SNAPS, HARNESS.

Covered Spring.....Add 30%
Judd's Pattern.....Add 33⅓% to list

SNATHS.

Double Ring, Bush.....per doz. $9 75
Patent Loop, Bush..... " 10 00
Patent Loop, Grass.... " 8 75

SNIPS, TINNERS'.

Clover Leaf.....40&10%
National..... .....40&10%
Star.....50%

SOLDER—See Metals.

SPRINGS, DOOR.

Perfect.
Nos..... 2 3 4 5 6 7
Per doz..55c 60c 65c 75c 90c 1 00
Reliance.
Light Medium Heavy
Per doz..$1 55 2 10 3 20
Torrey's..... ...per doz. 1 65

SPRINKLERS, LAWN.

Stearns' No. 1.....per doz. $8 50

SQUARES.

Steel and Iron.....Nets new list
(Add, for bluing, $3.00 per doz., net.)
Mitre.....
Try..... Nets
Try and Bevel.....
Try and Miter.....
Fox's.....per doz. $6 00
Winterbottom's.....10%

SQUEEZERS, LEMON.

Common Wood.....per doz. $0 70
Porcelain Lined, Wood. " 1 25
Boss, malleable iron.... " 1 20
Iron frame, porc'n bowl " 1 90
Iron Frame, glass bowl.. " 2 35
Little Giant, tin'd iron.. " 4 00
Drum, japanned..... " 3 60
Drum, nickel plated.... " 4 50

STAPLES.

Blind.
Barbed.....per lb. 21@22c
Butter Tub..... " 16@19c
Fence—
Polished.....per 100 lbs. $5 45
Galvanized..... " 6 15
Netting.
Galvanized.....per 100 lbs. 6 50
Wrought.
Wrought Staples, Hasps and Staples, Hasps, Hooks and Staples, and Hooks and Staples.....50&10%
Extra heavy.... .....35%

STEELYARD.

Discount 25%.

STONES.

Axe.
Hindostan.....per lb. New Nets
More Grit..... " "
Washita..... " "
Emery.
No. 126.....per doz. New Nets
Oil—Mounted.
Arkansas Hard No. 7 per doz. New Nets
Arkansas Soft..... " "
Washita No. 717... " "
Oil—Unmounted.
Arkansas Hard....per lb. New Nets
Arkansas Soft..... " "
Lily White..... " "
Queer Creek..... " "
Washita..... " "
Scythe.
Black Diamond....per gro. New Nets
Crescent..... " "
Green Mountain. " "
LaMoille..... " "
Extra Quinnebog. " "
Red End..... " "

STOPS, BENCH.

No. 10 Morrill pattern, per doz. $8 25
No. 11 Stearns " " 8 00
No. 15 Smith " " 5 25

STOPPERS, FLUE.

Common.....per doz. $1 10
Gem, flat, No. 3..... " 1 00
Gem, No. 1..... " 1 10

STOVE PIPE—See pipe.

STOVE BOARDS—See Boards.

STOVE POLISH—See Polish.

STRAPS.

Skate.....per doz. 85c & $1 20

STRETCHERS.

Carpet.
Bullard's.....per doz. $3 90
Excelsior..... " 5 25
Malleable Iron..... " 70
Perfection..... " 6 30
King..... " 4 50
Wire.
O. S. Elwood, No. 1...per doz. Nets
O. S. Elwood, No. 2.. " "

SWIVELS.

Malleable Iron.....per lb. $0 10
Wrought Steel.....per gro. 4 50

TACKS.

Bill Posters' 6-oz., 25 lb. boxes, per lb..... 17½c
Upholsters' 6-oz., 25-lb. boxes, per lb..... 18c

TAPES, MEASURING.

Asses' Skin.....List Net
Lufkin's Steel..... "
Lufkin's Metallic..List to list plus 20%
Lufkin's Pocket.....10%

THERMOMETERS.

Tin Case.....per doz. 80c@$ 1 25
Wood Back. . " $2 00@ 12 00
Glass..... " 12 00

TIES.

Bale.
Single Loop, carload lots.....75&7%
" " less than car lots 70&15%
Cow—See "Chains."

TOOLS, SAW.

Disston's Universal.....40%

TRAPS.

Mole.
Reddick's.....per doz. $9 50
Game with Chains.
Victor No. 1.....$1 65
Oneida Jump No. 1..... 2 25
Newhouse No. 1..... 3 85
Mouse and Rat. Net per gross
Out O'Sight Mouse.....$ 8 00
" " Rat..... 15 00
" " Mole.....100 00
#44 Pocket Gopher..... 20 00
Victor Mouse..... 2 60
Hold Fast Mouse..... 2 60
Victor Rat..... 11 00
Hold Fast Rat..... 11 00
Official Rat..... 13 50
Wood Choker Mouse, 4 Holes 11 00

TROWELS.

Brick.
Clover Leaf 30%
Brade's.....15&5%
Disston's.....30%
Rose's..... Net
Plasterers'.
Clover Leaf.....40%
Disston's.....25%
W. & McP.....Net

TRUCKS.

Bag.....each, $3 75
Warehouse or store.
No..... 1 2 3
Half Ironed.... $5 00 6 50 9 40
Full Ironed..... 5 75 7 50 11 00

TUBS, WASH.

Standard, Wood, Ex.
Nos..... 3 2 1 large
Perdoz...$9 50 11 25 12 75 15 50
Galvanized.
No..... 1 2 3
Per doz.....15 20 13 25 20 00

TWINE.

Market Quotation
3-ply Cotton Wrapping..... ....
4 " " .....
4 Extra Wrapping.....
4 " Hvy. Wrapping..
4 " Wrapping on tubes...
3 " " cones. .
4 " " " ...
India Hemp, ½-lb. balls, No. 18..
2-ply Jute, 1-lb. balls.....
Seins. Market
Soft.....per lb ..... Quotation
Med..... " ..... "
Hard..... " ..... "
Staging, ½-lb. ball, size 21..... "
" " " 24..... "
" " " 27..... "
Bagging, ½-lb ball..... "
3-ply, "B" in hanks..... "
4- " "B" " ..... "
3- " "A" " ..... "
3- " Silver Finish, in hanks... "
Fodder or Lath.
130 strand..... "

VISES.

No. 21, Hand..... $4 50
Oval Slide,
Inches 2 2½ 3 3½ 4½
Each.$2.00 $2.25 $2.55 $4.10 $7.00
No. 0, Stearns' Saw, common pattern.....per doz. $6 25
No. 3, Stearns' Saw, common pattern.....per doz. 10 50
No. 4 Stearns' Saw, common pattern.....per doz. 11 50
No. 5, Stearns' Saw, Ball and Socket pattern.....per doz. 16 00
No. 1, Genuine Wentworth, Noiseless Saw.....per doz. 10 50
No. 2, Genuine Wentworth, Noiseless Saw.....per doz. 16 25
No. 3, Genuine Wentworth, Noiseless Saw.....per doz. 14 25
No. 500, All Steel Folding Saw .....per doz. 10 50

WARE.

Stone Hollow Ware.
Plain or Unground.....50%
Ground Ware.....4%
Enameled Ware.....33⅓%
Scotch Bowls.....60&5%
Country Hollow Ware, per 100 lbs.$3 00
White Enameled Ware.
Maslin Kettles.....50%
Neverbreak Flat and Round Bottom Kettles.....45%
Covered Ware
Tin'd and Turn'd.....35&10%
Enameled.....45&10%
Glue Pots.
Tinned.....Add 15% to list
Enameled.....30%
Enameled.
Cherry Blossom and Chrysolite.50%

WASH BOARDS—See Boards.

WASHERS.

Standard O. G. cast iron...per lb. 3½c
Wrought steel in 5-lb. boxes, per lb.:
In.3/16 ¼ 5/16 ⅜ ½ ⅝ ¾ ⅞ 1
18c 16c 15c 13c 12c 11½c 11c 11c 11c

WEDGES.

Ax.....per doz. Nets
Galling.....per lb. "
Saw..... " 8½

WEANERS.

Calf.
Fuller's, per doz.....$2 00 to $2 50
Tyler's Safety, per doz. 1 85 to 2 40
Carroll's, per doz.... 3 00 to 3 75
Hoosier, per doz..... 3 50 to 4 60
Shaw Perfected..... 3 00 to 3 75

WEIGHTS.

Hitching.....per lb. Nets
Sash—f.o.b. Chicago
Ton lots, per ton.....$44 00
Smaller lots, per ton..... 46 00

WHEEL BARROWS.

No. 4 Tubular Steel.....@ $7 00
Common Tray or Stave Tray @ 2 25
Angle leg, garden..... @ 4 00

WHEELS.

Carborundum.....50%
Emery.....60%
Well. Ins..... 8 10 12
Per doz.....$5 50 7 25 8 50
12 in. heavy hoisting, per doz. $25 00

WIRE.

Brass.
In coils.....Nets
In 1-lb. spools, new list.....Nets
Broom—Tinned.....Nets
Cable—Same price as Barbed Wire.
Copper.
In coils.....Nets
1-lb. spools, new list.....Nets
Fence—Smooth. An'eal'd Galv'd
Nos. 6 to 9, less than car, per 100 lbs....$4 25 $4 95
Hair—New List.....40&10%
Market. Market Quotations
Bright, full bdles..... "
Bright, broken bdles..... "
Coppered, full bdles..... "
Coppered, broken bdles..... "
Tinned, full bdles..... "
Tinned, broken bdles..... "
Picture—In coils.....80%@80&10%
In 5-lb. spools.....per lb.....26c

WRENCHES.

Acme Standard.....50&10%
Alligator No. 1.....90c net
Always Ready.....30%
Agricultural.....50&5%
Ellis Adjustable.....25%
Malleable "S".....per lb. 08c
Malleable..... " 08c
Stillson Pipe.....60%

Bemis & Call's:

Adjustable S, 15%; Adjustable S Pipe, 15%; Briggs' Pattern, 10%
Combination Bright.....20%
Steel Handle Nut.....20%
Combination Black.....20%
Merrick Pattern.....20%

Knife Handle Pattern.
No. 62, Screw Wrench. List, plus 5%
No. 60, Steel Handle.. "

WRINGERS.

No. 790, Guarantee....per doz. $58 00
No. 770, Bicycle..... " 54 00
No. 110, Domestic.... " 47 50
No. 110, Brighton..... " 43 50
No. 740, Bicycle..... " 54 00
No. 22, Domestic..... " 47 50
No. 22, Pioneer..... " 43 50
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Berger Bros. Co., Philadelphia, Pa.

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Henry-Miller Foundry Co., Cleveland, Ohio.
Hess-Snyder Co., Massillon, Ohio.
Kansas City Furnace Co., Kansas City, Mo.
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Lennox Furnace Co., Marshalltown, Iowa.
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Enterprise Mfg. Co. of Pa., Philadelphia, Pa.

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Bertsch & Co., Cambridge City, Ind.
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Niagara Machine & Tool Wks., Buffalo, N. Y.

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Enterprise Mfg. Co. of Pa., Philadelphia, Pa.

Ornaments—Sheet Metal.
Friedley-Voshardt Co., Chicago, Ill.

Patterns—Stove.
Cleveland Castings Pattern Co., Cleveland, Ohio.
Cope-Swift Co., Inc., Detroit, Mich.
Quincy Pattern Co., Quincy, Ill.
Vedder Pattern Wks., Troy, N. Y.

Pipes and Fittings—Furnace.

Henry-Miller Fdry. Co., Cleveland, Ohio.
Lamneck Co., W. E., Columbus, Ohio.
Meyer & Bro. Co., F., Peoria, Ill.
Michigan Safety Furnace Pipe Co., Detroit, Mich.
Standard Furnace & Supply Co., Omaha, Neb.
Stearns Register Co., Detroit, Mich.

Pipe and Fittings—Stove.

Hemp & Co., St. Louis, Mo.
Meyer & Bro. Co., F., Peoria, Ill.
Michigan Safety Furnace Pipe Co., Detroit, Mich.
Sullivan-Geiger Co., Indianapolis, Ind.
Whitaker-Glessner Co., Wheeling, W. Va.

Pipe—Conductor.

Berger Bros. Co., Philadelphia, Pa.
Burton Co., W. J., Detroit, Mich.
Clark-Smith Hdw. Co., Peoria, Ill.
Friedley-Voshardt Co., Chicago, Ill.
Hussey & Co., C. G., Pittsburgh, Pa.
Whitaker-Glessner Co., Wheeling, W. Va.

Polish—Metal.

Nickel Plate Stove Polish Co., Chicago, Ill.

Polish—Stove.

Nickel Plate Stove Polish Co., Chicago, Ill.

Posts—Steel Fence.

American Steel & Wire Co., Chicago, Ill.

Powder.

Du Pont de Nemours & Co., E. I., Wilmington, Del.

Presses—Lard.

Enterprise Mfg. Co. of Pa., Philadelphia, Pa.

Punches.

Bertsch & Co., Cambridge City, Ind.
Niagara Machine & Tool Wks., Buffalo, N. Y.

Punches—Hand.

Whitney Mfg. Co., W. A., Rockford, Ill.

Ranges — Combination Gas and Coal.

Ringen Stove Co., St. Louis, Mo.

Rasps.

Delta File Wks., Philadelphia, Pa.
Heller Bros. Co., Newark, N. J.

Registers—Warm Air.

Excelsior Steel Furnace Co., Chicago, Ill.
Hart & Cooley Co., New Britain, Conn
Henry-Miller Foundry Co., Cleveland, Ohio.
Standard Furnace & Supply Co., Omaha, Neb.
Stearns Register Co., Detroit, Mich.
Walworth Run Fdy. Co., Cleveland, Ohio.

Roasters.

Lalance & Grosjean Mfg. Co., Chicago, Ill.
Whitaker-Glessner Co., Wheeling, W. Va

Rolls—Forming.

Bertsch & Co., Cambridge City, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.

Roofing—Iron and Steel.

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Burton Co., W. J., Detroit, Mich.
Cortright Metal Roofing Co., Philadelphia, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Tanner & Co., Indianapolis, Ind.
Whitaker-Glessner Co., Wheeling, W. Va

Rubbish Burners.

Hart & Cooley Co., New Britain, Conn.

Rules.

Lufkin Rule Co., Saginaw, Mich.

Saws.

Atkins & Co., E. C., Indianapolis, Ind.

Schools — Sheet Metal Pattern Drafting.

National School of Sheet Metal Pattern Drafting, St. Louis, Mo.

Screens—Perforated Metal.

Harrington & King Perforating Co., Chicago, Ill.

Sheets—Black and Galvanized.

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Dearborn Steel & Iron Co., Chicago, Ill.
Whitaker-Glessner Co., Wheeling, W. Va.

Skylights.

Burton Co., W. J., Detroit, Mich.

Snips—Tinsmiths'.

Niagara Machine & Tool Works, Buffalo, N. Y.

Solder.

Allen Co., Inc., L. B., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.

Soldering Iron—Self-Heating.

Allen Co., Inc., L. B., Chicago, Ill.

Soldering Supplies.

Allen Co., Inc., L. B., Chicago, Ill.

Specialties—Hardware.

Atkins & Co., E. C., Indianapolis, Ind.
Delta File Wks., Philadelphia, Pa.
Enterprise Mfg. Co. of Pa., Philadelphia, Pa.
Heller Bros. Co., Newark, N. J.
Hyfield Mfg. Co., New York, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Stover Mfg. & Engine Co., Freeport, Ill.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

Stars—Hard Iron Cleaning.

Fanner Mfg. Co., Cleveland, Ohio.

Statuary.

Friedley-Voshardt Co., Chicago, Ill.

Sticks—Soldering.

Allen Co., Inc., L. B., Chicago, Ill.

Stoves—Gasoline and Kerosene.

Ringen Stove Co., St. Louis, Mo.

Stoves and Ranges.

Ringen Stove Co., St. Louis, Mo.
Schill Bros. Co., Crestline, Ohio.

Stove Pipe Reducer.

Sullivan-Geiger Co., Indianapolis, Ind.

Stuffers—Sausage.

Enterprise Mfg. Co. of Pa., Philadelphia, Pa.

Tacks, Staples, Spikes.

American Steel & Wire Co., Chicago, Ill.

Tapes.

Lufkin Rule Co., Saginaw, Mich.

Tiles and Shingles—Metal.

Burton Co., W. J., Detroit, Mich.
Cortright Metal Roofing Co., Philadelphia, Pa.
Merchant & Evans Co., Philadelphia, Pa.
Milwaukee Corrugating Co., Milwaukee, Wis.
Whitaker-Glessner Co., Wheeling, W. Va.

Tin—Perforated.

Harrington & King Perforating Co., Chicago, Ill.

Tinplate.

American Sheet & Tin Plate Co., Pittsburgh, Pa.
Merchant & Evans Co., Philadelphia, Pa.
Whitaker-Glessner Co., Wheeling, W. Va.

Tools—Carpenters'.

Atkins & Co., E. C., Indianapolis, Ind.
Lufkin Rule Co., Saginaw, Mich.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

Tools—Sheet Metal.

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Niagara Machine & Tool Works, Buffalo, N. Y.
Tanner & Co., Indianapolis, Ind.
Whitney Mfg. Co., W. A., Rockford, Ill.

Tools—Tinsmiths'.

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Niagara Machine & Tool Works, Buffalo, N. Y.
Tanner & Co., Indianapolis, Ind.
Vaughan & Bushnell Mfg. Co., Chicago, Ill.

Torches.

Allen Co., Inc., L. B., Chicago, Ill.
Ashton Mfg. Co., Newark, N. J.
Bernz, Otto, Newark, N. J.
Burgess Soldering Furnace Co., Columbus, Ohio.
Clayton & Lambert Mfg. Co., Detroit, Mich.

Transit Companies.

Cleveland & Buffalo Transit Co., Cleveland, Ohio

Trimmings—Stove.

Fanner Mfg. Co., Cleveland, Ohio.

Troughs—Eaves.

Abbott Mfg. Co., Cleveland, Ohio.
Berger Bros. Co., Philadelphia, Pa.
Burton Co., W. J., Detroit, Mich.
Milwaukee Corrugating Co., Milwaukee, Wis.
Whitaker-Glessner Co., Wheeling, W. Va.

Valves—Humidifier.

Haynes, Kansas City, Mo.

Ventilators.

Berger Bros. Co., Philadelphia, Pa.
Friedley-Voshardt Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Standard Ventilator Co., Lewisburg, Pa.

Ventilators—Ceiling.

Hart & Cooley Co., New Britain, Conn.

Weatherstrips.

Burlington Blanket Co., Burlington, Wis.

Wood Faces.

Dover Wood Face & Lbr. Co., Dover, Ohio.

¶ ADVERTISING is the power of an idea multiplied.

¶ Other powers lose by expansion. Steam is power only when confined. Electricity radiated and diffused becomes nothing. Sound dies with distance. Great suns pale into invisible stars, and the power of light itself is lost in infinite space. But the strange power of advertising increases by expansion. Diffusion is its life. It grows by what it imparts.

¶ The advertised idea, to become a power, must be genuine, vital, and related to the function of a meritorious business; and the means of its furtherance must be well chosen.

¶ To choose well the means for the furtherance of *your* advertised idea, in order that it may become a power, in order that you may show its genuineness as a vital factor of your business, is not hard.

¶ A close perusal from cover to cover of this week's issue of AMERICAN ARTISAN AND HARDWARE RECORD will disclose abundant evidence of this fact.

WANTS AND SALES

For paid yearly subscribers. AMERICAN ARTISAN AND HARDWARE RECORD will insert under this head advertisements of not more than fifty words *WITHOUT CHARGE.* Employers wishing to secure employes, parties desiring to purchase or sell business, secure partners or to exchange, etc., will find that these pages offer excellent opportunities to satisfy their wants. Clerks and tinsmiths looking for situations will find it to their advantage to use these columns. Those who respond to these announcements please mention that they "READ THE ADVERTISEMENT IN AMERICAN ARTISAN AND HARDWARE RECORD."

BUSINESS CHANCES

For Sale—Half interest to sheet metal worker or plumber or business man understanding these lines. Good live town in eastern Iowa. Plenty of work on hand. Address C-14, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 22-3t

For Sale—One of the best equipped tin and plumbing shops west of Waco, Texas. In town of 2,000, with large trade territory. Fifteen deep test wells going down in from three to fifteen miles of town with good showing in several. Good reasons for selling. Will F. Hooker, Hico, Texas. 23-3t

For Sale—A good clean stock of hardware and stoves. Doing a fine business. County seat town and good farming country. A good proposition if sold by July 1. Central Iowa. Good reason for selling. Address C-19, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 24-3t

For Sale—Tin and furnace business. A paying proposition in a live town. Plenty of work on hand. One wishing to go into business can step in and go right ahead. Must sell on account of sickness. Must dispose of complete set of tools. It is located 139 miles from Chicago. Address C-9, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 22-3t

For Sale—A good clean stock of hardware, stoves and farm implements. Located in the best of farming communities in central Illinois. This is an old established business and a splendid opportunity to get a first-class hardware and implement business. Reason for selling, am advanced in years and want to retire. Please address C-17, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 22-3t

Well Established Stove Line Open for Michigan on Commission Basis—We are looking for a wide-awake, successful manufacturer's agent operating on a strictly commission basis and having no other obligations or ties that would prevent him from devoting to this line the energy and efforts it deserves.

This line now enjoys an extensive sale throughout the State. It's all clean-cut business, obtained strictly on merits. The business already established will pay an attractive salary. And the kind of man we are looking for can increase the present business materially.

The volume and possibilities of this business is such that first-class reference as to ability must be required. Also full information as to how long territory has been covered, how often and how closely it is worked and any other qualification possessed. Address Post Office Box No. 267, Quincy, Illinois. 23-4t

Wanted—Men who know their trade from A to Z. That's the way the advertisements for Help Wanted start. You can learn more about your trade if you read good books on the subjects you are less familiar with. For a book covering the subject of Warm Air Heating thoroughly, you should read Snow's Furnace Heating, 284 pages. Price $2.00. With AMERICAN ARTISAN one year (52 issues), $3.35. Order your copy today from Daniel Stern, 620 South Michigan Avenue, Chicago, Illinois.

HELP WANTED

Wanted—All around tinner and furnace man. Livingston Sheet Metal Works, Livingston, Montana. 23-3t

Wanted—Two tinners. Will pay 50c to 75c per hour. Benton Sheet Metal Works, Benton Harbor, Michigan. 22-3t

Wanted at Once—Tinner for inside and outside work. Good pay for a good man. Chas. F. Lumm, Garrett, Indiana. 24-3t

Wanted—Good opening for an up-to-date hardware clerk; also one good tinner. E. W. Lowell, Janesville, Wisconsin. 22-3t

Wanted — Combination tinner and plumber. Open shop. Will pay top wages. Stanek Hardware Company, Libertyville, Illinois. 24-3t

Wanted at Once—First-class bench man. Steady work. 75c per hour. Union shop. Young man preferred. Brizee Metal Works, Twin Falls, Idaho. 23-3t

Wanted—First-class mechanic to do tinning, plumbing and heating. Steady work to a good man in a good town. Siders & Hughes, Bement, Illinois. 24-3t

Wanted — An experienced hardware clerk. Give age, experience and references and state wages wanted in first letter. H. H. Toman, Cherokee, Iowa. 24-3t

Wanted—Tinners. Plenty of work and good job for men who can handle both inside and outside work. Scale 75c per hour. Herman's Tin Shop, Phone Highland Park, Illinois, 555. 23-3t

Wanted at Once—Good tinner; one who can do gutter work, warm air heating and roofing. Married man. State wages wanted for year-around job. Work 9 hours. R. H. Vandevede & Co., Dyersburg, Tenn. 22-3t

Wanted at Once—First-class all around plumber and tinner who can do hot air, steam and hot water heating. Wages 75c per hour. Steady work the year around. Apply to Carl Heinzelman, Midland, Michigan. 24-3t

Wanted—Sheet metal workers and roofers, men who can do inside and outside work. Steady. 75c per hour, union shop, 8-hour day. If interested and can come at once, wire us at our expense. Griffith and Dooley, Box 194, Charleston, West Virginia. 22-4t

Wanted—Tinners on dairy work. Good solderers. Married men preferred. No objection to age if you can handle job. Best of wages. 10 hours a day and five on Saturday during summer and nine in winter. Clinton Mfg. Company, Clinton, Wisconsin. 24-5t

Wanted—First-class sheet metal workers in Western city for shop work, doing ventilating and cornice work. Would like men who can lay out work if necessary, and willing to go out to put it up. Wages 75c per hour. Charles Haas, 1415 Davenport Street, Omaha, Nebraska. 22-3t

Wanted—All around tinner, plumber and heating mechanic. Steady employment the year around. Wages $25.00 per week and better, according to ability. Address C-13, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 22-3t

Wanted—First-class combination tinner and plumber; one who can install furnaces, repair pumps and take care of all work such as comes up in a country town of 1,000 population. Steady job year around for a good man. State wages wanted. W. Wilker, Wyoming, Iowa. 24-3t

Wanted—A good all around tinsmith by the first of June. Good wages and steady position. The best town in the state to live in. Located in southeastern South Dakota, town of 5,000. Address C-11, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 22-3t

Wanted at Once—A reliable and sober tinner for furnace work, gutters, galvanized roofing and general jobbing shop. Work the year around. City of 6,000. Board $6.00 per week. Address C-10, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 22-3t

Wanted—An A-1 furnace and sheet metal worker who can cut patterns and take full charge of the practical end in a growing manufacturing business; one who is able or willing to take a financial interest in the business to the extent of $500, if conditions are suitable to him. Address C-12, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 22-3t

HELP WANTED

Wanted—Capable retail hardware salesman and stockkeeper. Must have two or more years' experience. No implements. Address J. E. Ferguson Hardware Company, Kingman, Kansas. 23-3t

Wanted at Once—An all around plumber, tinner and heating man for warm air, steam and hot water. Steady work for the right man. A. L. Spradling, 218 East Main Street, Hoopeston, Illinois. 22-3t

Wanted at Once—An experienced hardware clerk, capable of decorating windows and keeping stock up. Steady job. When answering state salary wanted and experience. A. E. Browder, Albion, Nebraska. 22-3t

Wanted—First-class all around man who can do tinning, plumbing, steam, hot water and hot air heating, and anything that comes up in a country shop. Steady job and good wages for the right man. G. L. Freeto, Mechanicsburg, Illinois. 22-3t

Wanted—An all around plumber and tinner; also steam and hot water heating. Will pay $30.00 per week. Steady work the year around. Address C-16, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 22-3t

SITUATION WANTED

Situation Wanted—By an all around tinner in open shop. County seat town. Furnace town preferred. No plumbing. Fred E. Wittbecker, 95 Van Buren Street, Freeport, Illinois. 23-3t

Situation Wanted—In country town hardware store by a first-class mechanic, tinner, furnace workman and hardware salesman. Have had 20 years' experience. H. J. Ester, 725 West Main Street, Washington, Missouri. 22-3t

Situation Wanted—As manager or head clerk with up-to-date hardware firm by a first-class hardware man with 16 years' experience, 10 years as manager of my own business with proven success. Married, age 39. Would like a place with future opportunity. Address E. J. Drilling, Craig, Iowa. 23-3t

Situation Wanted—By first-class combination tinner and plumber. Am not particular as to location, but if you cannot offer steady year-around job at good wages there is no use to answer. State your wages and full particulars concerning your shop or no attention will be given. W. J. Coffin, Waverly, Iowa. 22-2t

Situation Wanted—By an all around heating and ventilating man who has been doing road work for the last seven years and would like to get in touch with some reliable firm that is in need of a man with my experience. Address C-18, care of AMERICAN ARTISAN AND HARDWARE RECORD, 620 South Michigan Boulevard, Chicago, Illinois. 24-3t

TINNERS' TOOLS

Wanted at Once — Eight-foot brake. Must be in good condition. S. R. Milbrandt, 918 S. First Street, Aberdeen, South Dakota. 24-3t

Wanted to Trade—Set 2" x 30" forming rolls for 1½" x 30" or 1¾" x 30". Address G. F. Chapman, Chapman & Spence, Akron, Ohio. 22-3t

For Sale—A nearly complete set of tinners' tools, stakes and machines. A number of them are almost new, including 27 inch shear, rolls and 42 inch folder. For list and prices address B. F. Stow, Wyanet, Illinois. 22-3t

For Sale—Two running store ladders and 160 feet track; one Moore's double seaming machine; one double seaming stake; one conductor stake. Peoples' Tin Shop and Repairing Company, 6249 Ingleside Avenue, Chicago, Illinois. 22-3t

For Sale—To those who wish to save time and money, J. W. Conchar's PRICE MAKER AND PROFIT DETERMINER is just the thing you need. This handy volume will be of the greatest value to you in regulating the list and selling prices of any article. The tables in this book are arranged to show the sold cost and the net profit and the percentage that must be added to the actual warehouse or store cost to bring the result desired. 170 pages. Cloth, $2.00, postage prepaid. Address Daniel Stern, 620 South Michigan Boulevard, Chicago, Illinois.